Annual AVMA Meeting
Detroit, Michigan
August 20-24, 1961

Journal

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Physical therapy (irradiation and ultrasonics) for canine paraplegia patient. Page 411

Vol. 138 April 15, 1961 No. 8

DURAGEN

Erysipelas Vaccine

Live Culture – Modified

A unique strain of *Erysipelothrix rhusiopathiae*, isolated ofter several years of research, forms the basis of DURAGEN, an improved erysipelas vaccine offered by Corn States Laboratories.

DURAGEN is completely safe; it cannot cause disease or contaminate lots. Reports from hogbelt practitioners confirm that DURAGEN is providing excellent immunity even in problem herds. It is available in 5, 10, 25, and 50 dose vials with diluent, at all CS distribution points.

CS

CORN STATES LABORATORIES, INC.

1124 HARNEY STREET • OMAHA, NEBRASKA

SUBSIDIARY OF ELI LILLY AND COMPANY

THE OVER-FAT HOG: times have changed in erysipelas vaccines, too!

EVA®

ERYSIPELAS VACCINE
LIVE CULTURE, AVIRULENT

- EVA is *avirulent* in contrast to the modified and "hot" types. EVA is avirulent—not attenuated, not virulent, and not a bacterin.
- EVA is *live culture* protection—yet it's completely safe and remarkably free from local reactions and swellings.
- EVA produces a rapid, high-immunity response. It protects under a wide range of conditions—from light to moderate to severe.
- EVA's safe, durable immunity is proved by six years of field use.

Supplied in: 5-2 doses, 5 doses, 25 doses and 50 doses
Dose is 2 cc for all weights and ages

Patented U.S., Canada

Norden

NORDEN LABORATORIES, INC.
LINCOLN, NEBRASKA

Journal

OF THE
AMERICAN VETERINARY
MEDICAL ASSOCIATION

Vol. 138 No. 8 April 15, 1961

CONTENTS

SMALL ANIMAL ARTICLES

Rehabilitation of Dogs with Intervertebral Disk Lesions by Physical Therapy Methods. I. Basic Aspects of Disk Lesions in Dogs—*Walter J. Jadeson* 411
II. Review of Treatment Methods—*Walter J. Jadeson* 414
III. A Pilot Study of the Effect of Physical Therapy — *Walter J. Jadeson* 416

LARGE ANIMAL ARTICLES

Histologic and Serologic Study of Subclinical Leptospirosis Among Cattle—*Seibold—Keech—Bokelman* 424
Effects of Organic Phosphoramidate (Ruelene) in Control of Nasal Botfly in Sheep—*Miller—Johnson—Stout* 431

GENERAL ARTICLES

Serologic Evidence of *Leptospira pomona* Infections in Meat Inspectors—*John E. Tobie and Norman B. McCullough* 434
Serologic Evidence of Certain Virus Infections in Wild Animals—*Parker—Cabasso—Dean—Cheatum* 437

EDITORIALS

Veterinary Technologists 441
Physical Therapy for Dogs 444

FEATURES

Correspondence ..... adv. p. 4
Report of Officers—*Jack O. Knowles* ..... adv. p. 6
Washington News ..... adv. p. 12
What Is Your Diagnosis? ..... adv. p. 31
History of the AVMA ..... adv. p. 42
PR Page ..... adv. p. 44

Contents continued on adv. page 4

EDITORIAL STAFF: D. A. Price, *Editor in Chief;* A. Freeman, *Assistant Editor;* H. E. Kingman, Jr., *Managing Editor;* R. G. Rongren, *Advertising Manager;* Eva G. Bailey, *Production Manager and Assistant to the Editors.*
AVMA OFFICERS: E. E. Leasure, Manhattan, Kan., *President;* C. M. Rodgers, Blandinsville, Ill., *Vice-President;* M. L. Morris, Allenspark, Colo., *President-Elect;* H. E. Kingman, Jr., Chicago, *Executive Secretary and Treasurer;* J. O. Knowles, Miami, Fla., *Chairman of the Executive Board.*

$15.00 per Annum Single Copies, $.75 Prepaid in U.S.
Canada, $15.50; Pan American Countries, $16.50; Foreign, $17.00
Published semimonthly at 600 S. Michigan Ave., Chicago 5, Ill., by the American Veterinary Medical Association. Second class postage paid at Chicago, Ill., and at additional mailing offices. Contents copyright 1961 by the American Veterinary Medical Association.

CHANGE OF ADDRESS: Send new address (and moving date) 45 days before moving. Include old address as it appeared on previous issues (if possible send label). Do not depend on the post office to forward the JOURNAL.

ANNOUNCING
A SIGNIFICANT ADVANCE
IN THE PREVENTION OF
CANINE DISTEMPER

TISSUVAX D-H*

the vaccine that produces
higher levels of protection
against DISTEMPER
than ever before reported

A Pitman-Moore development in tissue culture research.

*Trademark for CANINE DISTEMPER VACCINE, Modified Live Virus, Chick Tissue Culture Origin, and INFECTIOUS CANINE HEPATITIS VACCINE, Modified Live Virus, Porcine Tissue Culture Origin, Combined, Vacuum Dried

PITMAN-MOORE COMPANY
DIVISION OF ALLIED LABORATORIES, INC. • INDIANAPOLIS 6, INDIANA

Swine Disease Research Funds Inadequate

According to Dr. S. H. McNutt, of the National Swine Disease Advisory Committee, a total of $2,775,983 in public funds is being spent this fiscal year on swine disease research. Of the total, only 12% ($315,046) comes from the states themselves, although the state institutions use 46% of the total.

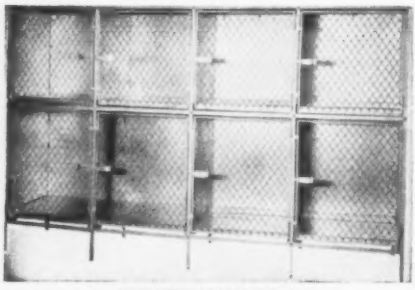
Currently, less than 0.5% of the value of the swine industry is being spent on swine disease research. Swine disease research funds provided by sources other than the federal government are: Alabama, $26,646; Arizona, $1,000; California, $6,000; Florida, $5,000; Georgia, $10,300; Illinois, $19,800; Indiana, $40,000; Iowa, $15,000; Kansas, $10,000; Michigan, $35,000; Missouri, $15,000; Nebraska, $60,000; New York, $2,000; North Dakota, $3,800; Ohio, $7,000; Oklahoma, $15,400; Pennsylvania, $24,640; South Dakota, $1,200; Texas, $19,000; West Virginia, $400; Wisconsin, $7,906.—*Nat. Hog Farmer (Dec., 1960): 10.*

Kennel Cage Units

of Wire Mesh and Metal

IN TWO TIERS: 4, 6, and 8 cage units
IN THREE TIERS: 6, 9, and 12 cage units

Sanitary, durable, easily maintained; galvanized materials; removable pans; hand woven wire mesh doors, maximum light and ventilation; sized for dogs and cats; removable partitions; shipped crated; easily assembled.



THE EIGHT CAGE UNIT
Shipped unassembled, saves freight charges
Terms may be arranged

EAST RIVER WIRE WORKS
39-40 Twenty-First St., Long Is. City 1, N.Y.

CONTENTS—*Continued*

ITEMS

Comparative Medical Studies of Chronic Degenerative Diseases 423
Pasteurella Mastitis Resistant to Antibiotics 436
Canadian View of Distemper Immunization 440

from the RESEARCH JOURNAL

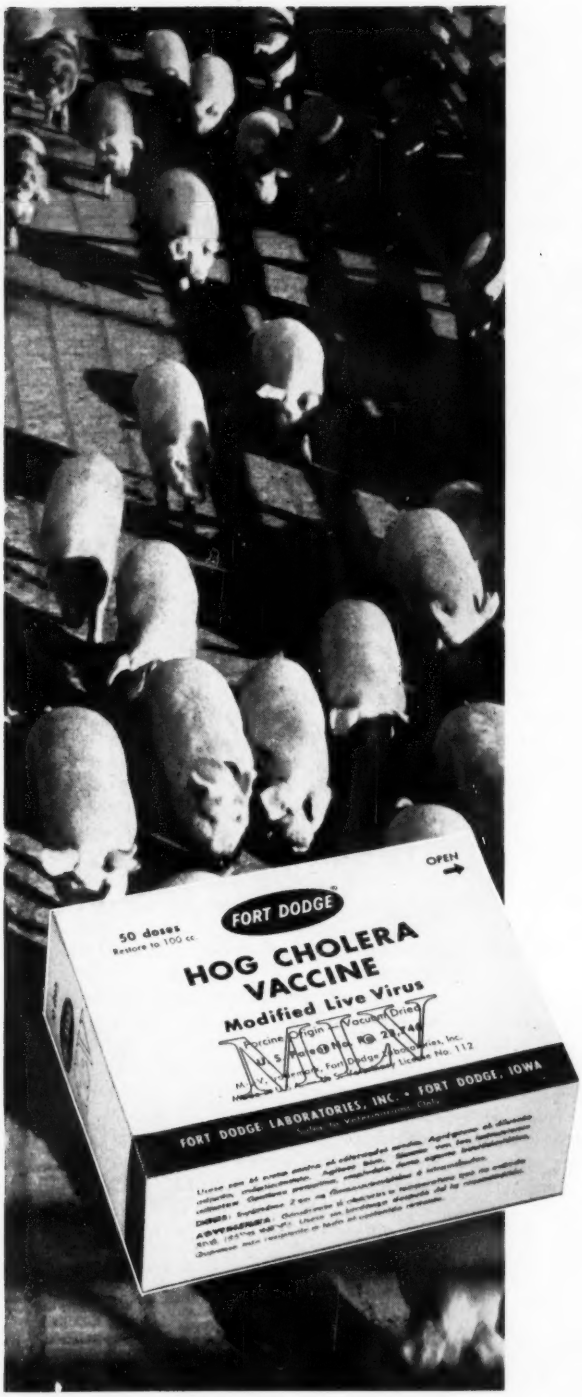
Siliceous Calculi in Kidneys 445
Blood Response After Hypervitaminosis D 445
Portal and Mesenteric Vein Catheters 445
Bayer 21/199 as an Anthelmintic 445
Effects of Time and Temperature on Swine Serum 446

NEW BOOKS

Reproduction in the Dog 446

NEWS

The American Association of Equine Practitioners Meets 447
First Hip Dysplasia Meeting Held 455
AVMA Council on Research Meets ... 455
High Priority Given for Sheep Parasite Research 456
Study of Normal Electrocardiogram in Dogs Planned 457
Dr. J. O. Knowles Receives Zeta Award 457
Society on Breeding Soundness of Bulls Meets 457
Effects of Butazolidin on Horses Studied 458
Research in Trout Cancer Slated 458
Dr. W. G. Evans Appointed to USDA Washington Staff 458
Dr. N. L. Meyer Promoted 458
Dr. R. C. Reisinger Transferred 459
Dr. R. L. Alkire Transferred to New Jersey 460
Dr. C. E. Stevens Joins USDA 460
Dr. A. G. Edward, Jr., Appointed to New Iowa Laboratory 460
Among the States and Provinces 461
Veterinary Military News 467
State Board Examinations 468
Deaths 468
Women's Auxiliary 470



you can place your confidence in

M·L·V®

the original modified live virus vaccine produced by

FORT DODGE®

® 'M·L·V' is the registered trademark for Fort Dodge brand modified live virus hog cholera vaccine. U. S. Patent Re-23746. Fort Dodge Laboratories, Fort Dodge, Iowa.

A Hospital Consultation Program

For 4 years a hospital consultation service has been underway in Florida until finally it has evolved into a formal program. Two men have been doing this work. One is a veterinarian with a graduate degree in administration. The other is a medical hospital director who has had a long association with veterinary activities.

Dr. Jack O. Knowles, Chairman
AVMA Executive Board

The consultations are held at each participating veterinary hospital about once yearly. Each visit requires some 3 hours and is by appointment. The consultant makes and records a careful inspection of the premises. He discusses a number of general points or "themes" with each veterinarian, then devotes the rest of the time to specific problems pertinent to the hospital being visited.

Experience has shown that all veterinary hospitals have certain characteristics in common, regardless of the location or size. These are the "themes" and include such items as doctor appearance, fire control, staff appearance, "image," and radiation protection.

The many other points discussed have included proper client reception, pharmacy management, establishment of fees, collection of fees, salary schedules and incentive programs, and efficient cleaning methods.

The Florida program is on a voluntary basis with the participant-veterinarian paying most of the cost of the visit and the state association the rest. Sixty-one consultations have been held as of March 1, 1961. They seem to be uniquely successful; apparently, everyone who has participated plans to continue.

One of the prime advantages of the consultants is the detached, factual attitude with which they approach problems. They are in a position to "see ourselves as others see us," a vantage point denied the practitioner.

Such a program should result in:

1. Better practice standards.
2. Improved animal care.
3. Increased public acceptance of veterinary medicine.
4. Adoption of good management practices.
5. The compilation of practice statistics for later factual analysis. These data could, in time, become quite valuable for determining rates, trends, and shifts.

Admittedly, few veterinarians are well-qualified administrators. Our formal training does not equip us for this activity and the nature of our work permits little time for administration. Yet administration profoundly influences our professional as well as financial success.

The AVMA is the veterinarian's life line and its officers are alert to the needs of the individual veterinarian. Do we have here a practice consultation program that holds considerable promise for most of our practitioners?

I am aware that comments concerning hospital inspection have been increasing and would like to know just how much interest there really is in this subject. If you are interested in inspection-consultation, or have thoughts about it which you feel should be considered by your Executive Board or the Council on Veterinary Service, please write to us at 600 S. Michigan Ave., Chicago 5, Ill.

Jack O. Knowles

Pre-Med®

(Prepared Media)

PRE-MED

Disposable Culture Plates in Individual Sterile Bags*

With these ready-to-use Mono-Plate® culture plates (plastic petri dishes containing prepared media) you are always ready to streak fresh specimens—no matter how many miles you may be from your laboratory. Just open sterile outer bag, lift plastic cover and streak agar with specimen. Read when incubation is complete, then destroy. Particularly useful in diagnosis of mastitis, infected wounds, fungus infections. Plates remain usable for months under normal refrigeration.

Supplied in a wide variety of wanted media. Fifty cents per plate in minimum quantity of 3 plates; lower cost in quantity.

*U. S. Patent No. 2,874,091

PRE-MED

Holding (Transport) Medium

A non-nutrient medium for transport of clinical swabs which neither inhibits nor enhances growth of bacteria. Permits holding specimens overnight or weekend until culture facilities are available. Convenient screw-cap vials are ready for immediate use in field or office. Unopened bottles store indefinitely at room temperature.

Supplied in 12-pack, with 24 swabs, at $4.50; in 100-pack with 200 swabs, at $30.00.

PRE-MED

Closed-System Culture Bottles

The modern way to collect and culture blood and body fluids. Bottles contain 50 cc Trypticase† Soy Broth with CO_2 added, a medium capable of revealing bacterial growth in its earliest stages. Specimens may be collected aerobically or anaerobically to detect a wide range of microorganisms. Unopened bottles store at room temperature.

Supplied with mailing box at $1.17 each; with sterile bleeding set and mailing box, $1.50 each; lower costs in quantity.

†Trypticase is a trademark of Baltimore Biological Laboratory, Inc.

Send for complete list of PRE-Med culture plates and culture products.

Available through your veterinary supply dealer or direct.

HYLAND LABORATORIES

4501 Colorado Blvd., Los Angeles 39, Calif.
Branch office: 160 Lockwood Ave., Yonkers, N. Y.

New Mastalone treats mastitis with broad spectrum in depth

Supplies the unusually wide-range antimicrobial activity of oxytetracycline

Contains oleandomycin and neomycin for added depth of treatment and for activity against organisms that may be resistant to penicillin or streptomycin

Reduces inflammation with prednisolone, which is three times as effective as hydrocortisone

Contains no penicillin

Almost all of the common types of the bacterial pathogens causing bovine mastitis can be treated effectively with new Mastalone.

Its unique combination of antimicrobial and anti-inflammatory agents supplies *true* broad-spectrum treatment in depth . . . in a formulation available only to veterinarians. It promotes increased effectiveness in treating most types of mastitis commonly encountered by the veterinarian today.

True broad spectrum

It offers the unusually wide-range activity of effective, time-proven oxytetracycline hydrochloride.

Added depth of spectrum

Mastalone contains neomycin . . . an antibiotic that exhibits the same general coverage of organisms as streptomycin . . . yet with wider spectrum. And neomycin also demonstrates effectiveness against streptomycin-resistant organisms. It is particularly effective against Proteus and Pseudomonas.

Combats penicillin-resistant organisms

New Mastalone contains no penicillin. Instead, it is formulated with oleandomycin—one of the newest antibiotic agents—developed specifically to help combat strains of staphylococci and streptococci which may be resistant to other narrow-spectrum antibiotics.

Potent anti-inflammatory activity

Prednisolone is provided to reduce tissue inflammation. This corticosteroid is three to five times more potent than hydrocortisone and shows significantly fewer side effects.

See your Pfizer representative for complete details.

Supplied in 10-cc. tubes, Mastalone contains:

- 200 mg. of oxytetracycline (as hydrochloride).
- 100 mg. of oleandomycin base.
- 100 mg. of neomycin (as sulfate).
- 5 mg. of prednisolone (Sterane®).
- Special base, Q. S.

Warning: Milk taken from dairy animals within 72 hours after treatment for mastitis should not be used for food.

Sold only to veterinarians.

Department of
Veterinary Medicine
Chas. Pfizer & Co., Inc.
New York, N.Y.

Pfizer

Science for the world's well-being ™

MASTALONE®

Brand of oxytetracycline hydrochloride, oleandomycin, neomycin sulfate, prednisolone (Sterane®) in a special base.

Healthy litters and sows come from a planned, complete-cyclic feeding program.

Too few hog breeders realize that anemia, scours, rickets, parasites, TGE, erysipelas and other pig-killers are directly or indirectly caused by poor nutrition before the pig is farrowed. Weak baby pigs are easy targets for disease—and are also the most frequently lost by the sow laying on them.

Clearly, the easiest and cheapest method of keeping pig losses low is by proper sow nutrition, even before breeding. RIBAD II and CON-O-Mineral fortify pre-breeding rations by furnishing ample Vitamin A plus a balance of other essential nutrients. Then, during the gestation and lactation periods, when Vitamin A requirements go up five-and-ten-fold, CON-O-Mineral and RIBAD II help keep sows in the best condition to develop strong, disease-resistant pigs. This means more pigs weaned . . . and at better weights.

Get the full story of better profits through better nutrition in the all-new VpC LIVESTOCK FEED BOOK—facts and formulas for all feeding situations. Write now!

VITAMINERAL PRODUCTS CO. **PEORIA, ILLINOIS**

Via-D-Mineral...CON-O-Mineral...Viamineral...RIBAD...Via-Z-Mineral...VpC Dog Food Supplement

SOLD ONLY THROUGH VETERINARIANS FOR OVER 40 YEARS

When you are treating ringworm...
there is no better way to round out oral therapy

FULVIDEX™

GRISEOFULVIN + UNDECYLENIC ACID

Aerosol

Used adjunctively, this topical aerosol enhances the therapeutic value of FULVICIN and gives an added measure of protection against the spread of infection.

FULVIDEX coats infected hair and skin with a fungistatic mantle highly active against the Microsporon and Trichophyton species. Applied locally, it prevents the spread of infection to human beings or pets—recommended particularly for animals when hair clipping is undesirable.

FULVICIN®

GRISEOFULVIN

a valuable companion therapy

Orally effective fungistatic antibiotic for dogs, cats—halts growth of fungi from within. Tineas of the skin, hair and claws clear dramatically.

packaging: FULVIDEX Aerosol, 2 per cent griseofulvin with 4 per cent undecylenic acid, 50 Gm. container, carton of 12; FULVICIN Tablets, half-scored, 100 mg., bottle of 100; 250 mg. and 500 mg., bottles of 100 and 500.

For complete details, consult latest Schering Literature available from your Schering Veterinary Representative or Veterinary Medical Department, Schering Corporation, Union, New Jersey.

Schering

4038 August, 1960

news from Washington . . .

FROM THE AVMA WASHINGTON OFFICE
J. A. McCallam, VMD
Brig. Gen. USA (Ret.)

House Passes Food Additives Amendment Bill

The House, adopting several committee amendments, passed *H.R. 3980*, to amend the transitional provisions of the Food Additives Amendment Act of 1958. Bill continues transition period and use of certain food additives and pesticide chemicals pending completion of investigations to June 30, 1964.

Senate Passes Pesticide Bill

The Senate, on March 20, passed with Committee Amendment *S. 1028*, To extend, on certain products, effective date of Nematocide, Plant Regulation, Defoliant, and Dessicant Amendment Act of 1959. Purpose is to extend transitional provisions of the Act (P.L. 86-139) until such time as the Pesticide Chemicals provisions is made fully applicable. (*Senate Report* 74, 87th Congress). An identical bill, *H.R. 4662*, was reported favorably by House Committee on Agriculture in March, 1961. (*House Report* No. 61).

The following bills have been introduced in Congress:

Loans for Higher Education

H.R. 5266, Rep. (Mrs.) Green (D., Ore.)—To authorize loans to institutions of higher education or higher education building agencies for construction of academic facilities. Bill would also amend Title II of National Defense Education Act to authorize scholarships for undergraduate study in such institutions. *NOTE*—Special Subcommittee on Education, House Committee on Education and Labor, began hearings on this bill on March 15, 1961, with testimony by Secretary Ribicoff, Dept. of HEW, and various public witnesses. Similar bill introduced in Senate by Sen. Hill (D., Ala.) and 13 co-sponsors is *S. 1241*.

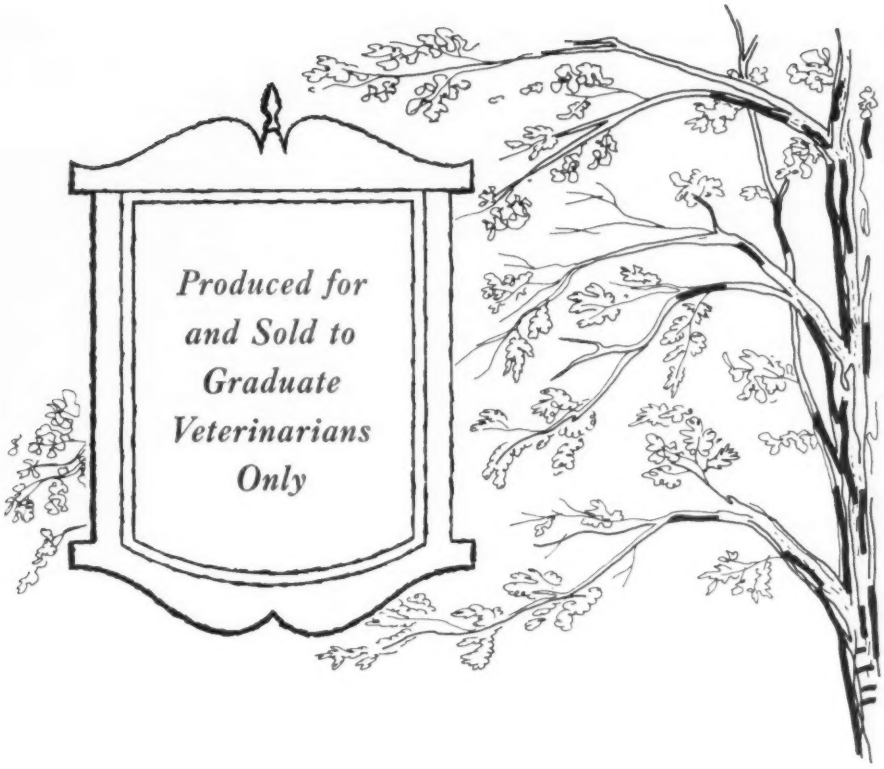
College Loans and Scholarships

Sen. Bush (R., Conn.) *S. 1226*—To increase the college housing loan authorization (Housing Act of 1950); *S. 1227*—to amend the National Defense Education Act of 1958 to authorize the granting of national defense scholarships; and *S. 1228*—to amend National Defense Education Act of 1958, to extend for 5 years the assistance provided under the provisions of the Act and to make certain changes in such provisions.

Educational Exchanges

S. 1154, Sen. Fulbright (D., Ark.), and *H.R. 5203*, Rep. Hays (D., Ohio)—Identical bills to provide for the improvement and strengthening of the international relations of the U.S. through educational and cultural exchanges.

(Continued on adv. page 14)



A proven biologic of merit... Affiliated Brand

HOG CHOLERA VACCINE

Induces immediate, long-lasting immunity when used with proper dose of anti-hog cholera serum.

AVAILABLE IN PACKAGES OF 2, 5, 10, 25, and 50 DOSES

AFFILIATED LABORATORIES CORPORATION

WHITE HALL, ILLINOIS

Corn Belt Laboratories, Inc.
The Gregory Laboratory, Inc.

Affiliated

Grain Belt Supply Co.
The National Laboratories Corp.

Grants for Veterinary Medical Educational Facilities

S. 1393, Sen. Humphrey (D., Minn.)—To authorize a 10-year program of grants for construction of veterinary educational facilities and other purposes.

Sen. Humphrey, when introducing the bill, stated:

"Mr. President, I introduce for appropriate reference a bill to authorize a 10-year program of matching grants for construction of veterinary medical education facilities. It would provide, first, for each of the next 4 years, $5,000,000 for expansion and improvement of existing schools of veterinary medicine, and second, for each of the next 10 years, $1,000,000 for construction of new schools of veterinary medicine.

Sen. Hubert Humphrey

"The federal government's share of the cost would be limited to 2/3. The program would be administered by the Surgeon General of the United States Public Health Service.

"The proposed legislation is based on the fact that veterinary medical science plays a crucial role not only in the nation's agriculture effort, but in human health as well. The cornerstone of all science, veterinary and other, is education. But today veterinary education faces a critical shortage of modern facilities comparable to the shortage which exists as regards other schools of medicine. The result is to seriously handicap the nation.

"The bill represents an effort to cope with but one phase of the overall problems of veterinary science. Other actions will also be necessary. There is a serious insufficiency of veterinarians today and, far from being remedied, the manpower crisis will be growing more acute unless a comprehensive program (of which the bill being introduced today is but one part) is developed. This will require the fullest cooperation of the profession, the states, and municipalities with the federal government. This fact is elaborated upon in a committee print on veterinary science to be released next month by the Subcommittee on Reorganization and International Organizations, of which I am the chairman."*

The bill (*S. 1393*) to authorize a 10-year program of grants for construction of veterinary medical educational facilities and other purposes, introduced by Sen. Humphrey, was received, read twice by its title, and referred to the Committee on Labor and Public Welfare.

*Congressional Record—March 21, 1961

FIGHT MASTITIS WITH A MILKER?

Yes! Gentle De Laval milking can help you do it!

It's no secret that rough milking machines, or improper milking, can predispose dairy cows to mastitis. That's why you should know there's a method of milking that's remarkably *gentle* on cows' sensitive teats and udder tissues . . . so gentle it can help you and dairymen in the fight to keep herds mastitis-free.

De Laval milking provides maximum protection to udders to help any mastitis prevention program work better. Here are the reasons why:

1. Other milkers use wide-bore liners that cause cows' teats to "balloon" to fill extra space. De Laval uses narrow-bores that fit snug, reduce impact when liners collapse, minimizing danger of udder injury.

2. Our magnetic pulsation assures *absolutely uniform milking* with never a variation. Pulsators are factory set, won't get out of adjustment.

3. De Laval cuts vacuum drop-offs that cause slow, erratic milking. Our *rotary* vacuum pump assures rapid vacuum recovery for faster, more uniform milking.

These exclusive features are the difference between harsh milking and the *gentle* milking dairymen need for maximum protection of cows' udders to help prevent mastitis. Gentle milking is built right into every De Laval milker . . . Suspended, Pail-Type, Cow-to-Can® and Combine Milker®. For further information, write: The De Laval Separator Co., Poughkeepsie, N. Y., or 5724 N. Pulaski, Chicago 46, Ill., or 201 E. Millbrae Ave., Millbrae, California.

pioneers in better milking for more than 75 years

DE LAVAL

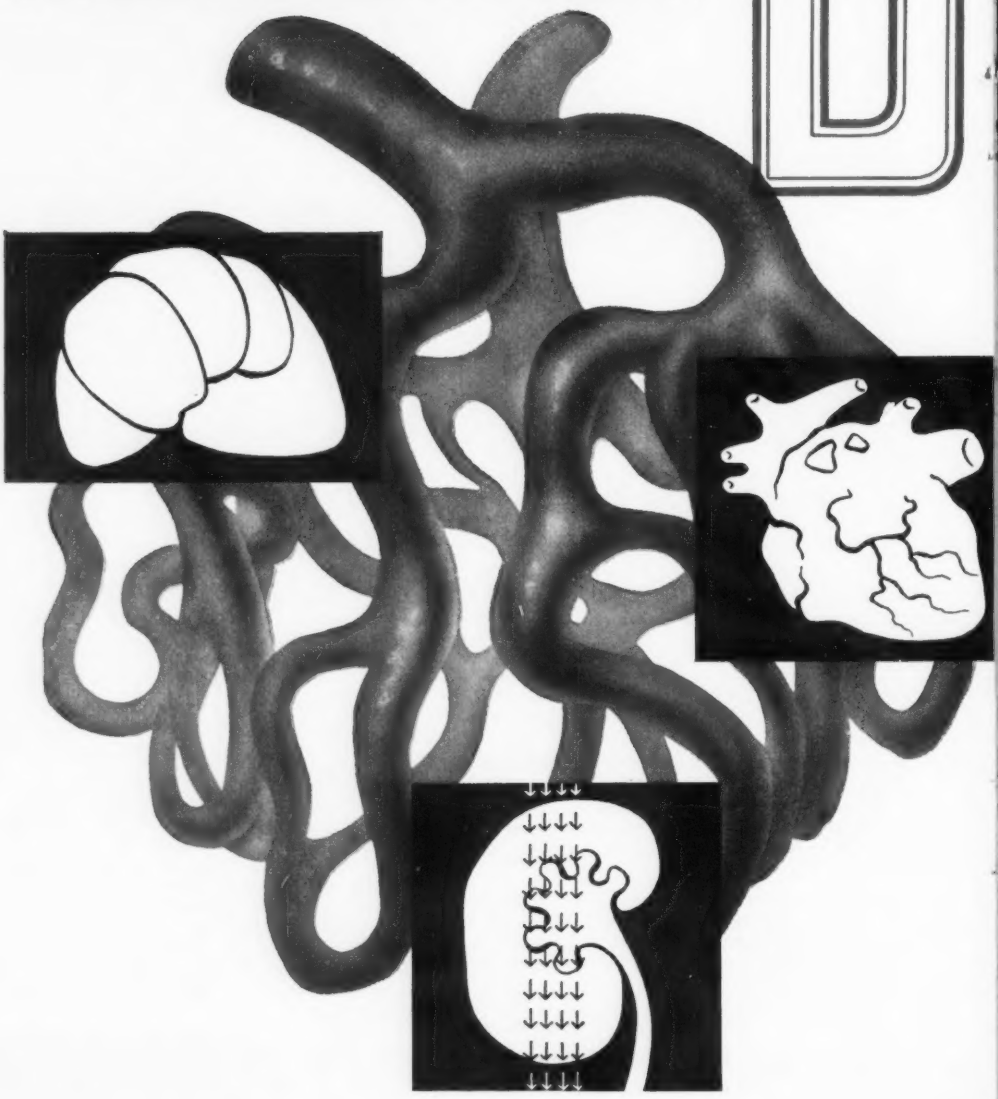
Diuresis

ANNOUNCING DIURIL BOLUSES

FOR THE PROMPT RELIEF OF MAMMARY EDEMA AND OTHER EDEMATOUS CONDITIONS IN CATTLE!

For further information, call your distributor or write to Veterinary Department, Merck Chemical Division, Merck & Co., Inc., Rahway, New Jersey, for a professional sample and literature.

D



with minimal toxicity...without drug refractoriness

DIURIL®

DIURIL is an exceptionally potent, nonmercurial diuretic indicated in canine practice in the treatment of congestive heart failure, renal edema and hepatic ascites.

Orally administered, DIURIL grants prompt diuresis for as long as it's prescribed, both to initiate diuresis and to maintain an edema-free state. Its high therapeutic index and low inherent toxicity are evidence that DIURIL is the definitive diuretic for small-animal practice.

A NEW APPROACH TO DIURETIC THERAPY

Until now, there have been many drawbacks in the use of diuretics. The mercurials, for example, were renal irritants which could prove toxic to the patient. The newer drugs are characterized by early refractoriness, and are frequently not effective for the full course of treatment. (These drugs can also produce acidosis as a result of their nonspecific inhibition of carbonic anhydrase.)

But new DIURIL is subject to none of these disadvantages. Onset of action following oral administration is rapid (within two hours), and its major effect is complete in the dog within six hours. DIURIL has low inherent toxicity —apparently inhibits the action of carbonic anhydrase only in the renal tubular mechanism. Even in the presence of severe cardiac, renal or hepatic disease, this saluretic agent may be safely administered.

The safety of DIURIL is matched only by its effectiveness. In clinical trials with experimentally induced ascites in normal dogs, DIURIL produced a prompt and profound saluresis and diuresis, with a reduction of weight to normal. In case after case, DIURIL has shown itself to be the diuretic for treating small animals.

CLINICAL INDICATIONS

Congestive Heart Failure. DIURIL produces copious water diuresis, rapid reduction of ascites and loss of weight. Dramatic improvement in peripheral and pulmonary edema, dyspnea, cough, ascites and pleural effusion. Dogs frequently return to normal activity.

Renal Edema. DIURIL, when administered in such forms of renal edema as those associated with nephrosis and some types of nephritis, results in prompt excretion of retained fluid and electrolytes.

Hepatic Ascites. DIURIL may be administered even in cases of severe hepatic disease for the correction of fluid and electrolyte retention, unless the basic pathologic process within the liver is progressive.

Miscellaneous Edematous Conditions. Two common examples of fluid retention or secondary congestion of organs are: edema of the spinal cord (often a complication of "posterior paralysis syndrome"); and congestion of the mammary gland in postparturient bitches deprived of their litters (or those in which false pregnancy is a problem). DIURIL frequently produces rapid relief from such symptoms by inducing prompt loss of excess fluid.

Dosage: 5-10 mg./lb. of body weight, two or three times daily.
Supplied: No. 55621—DIURIL Tablets (Veterinary)—0.25 Gm. each —bottles of 100. Sold to veterinarians only.

MERCK CHEMICAL DIVISION
MERCK & CO., INC. • RAHWAY, NEW JERSEY

VETERINARY

® TRADEMARK OF MERCK & CO., INC. FOR CHLOROTHIAZIDE.

large or small Pet-Tabs®

has taste appeal for all!

Open mouths. Must be Pet-Tabs time. And why not? Pet-Tabs is the vitamin-mineral dietary supplement that's meat-flavored for gulping acceptance.

Other benefits? Sure . . . plenty of them. Ingredients are combined to balance the ration daily, speed recovery from illness and shorten convalescence after surgery. No more complicated additions to rations, *but you still keep older animals healthy and vigorous and aid growth in the younger ones.*

And for cats and toy breed dogs—Pet-Tabs, Jr., tasty formula in smaller size tablet.

DOSAGE: Usually 1 Pet-Tab or 1 Pet-Tab, Jr. daily.

SUPPLIED: In bottles of 50 each—sold to veterinarians only.

THE S. E. MASSENGILL COMPANY
Veterinary Division
Bristol, Tennessee

ARMOUR PITUITARY HORMONE PREPARATIONS FOR VETERINARY USE

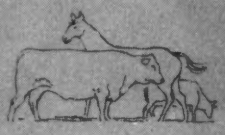
FSH-p

Purified Pituitary Follicle Stimulating Hormone

For treatment of genital infantilism, gonadal regression, incomplete follicular development, persistent luteal cysts, aspermia. Vials of 50 mg. (lyophilized).

P.L.H.®

Pituitary Luteinizing Hormone



Used to effect prompt ovulation, treatment of follicular cysts. Preferred treatment of aberrant estrus due to luteal cysts. *In the male*, promotes production and release of the male hormone. Vials of 5 cc. (lyophilized) packaged with 5 cc. vial P.L.H. diluent.

P.O.P.®

Purified Oxytocic Principle

To precipitate labor and accelerate normal parturition; for dystocia due to uterine inertia; promotes uterine contraction when desired; stimulates milk letdown. Vials of 10 cc. and 30 cc. (20 U.S.P. Units per cc.).

© 1960, A. P. Co.

SOLD ONLY TO LICENSED VETERINARIANS

VETERINARY DEPARTMENT
ARMOUR PHARMACEUTICAL COMPANY
KANKAKEE, ILLINOIS

ARMOUR

When
dairy
profits
go
down
the
drain . . .

help put those profits back in your clients' pockets with

Erythrocin® INJECTABLE VETERINARY

1 TO 2 MG./LB. BODY WEIGHT . . . ADMINISTRATION ONCE DAILY . . . 48-HOUR WITHDRAWAL PERIOD

When the dairy animals you treat exhibit the symptoms of upper respiratory infection, pneumonia, mastitis, the pneumonia-enteritis complex, metritis, foot rot, and secondary infections, new Erythrocin Injectable Veterinary offers you a combination of advantages that is hard to beat.

Relatively Low Dosage Levels Make for Economical Treatment

Erythromycin Injectable is effective at dosage levels of 1 to 2 mg. per pound of body weight, considerably less than many other antibiotics—this means real savings for you and your clients.

Once-A-Day Dosage and 48-Hour Withdrawal Period

Any of the conditions for which Erythrocin Injectable is indicated usually respond on a once-every-24-hours treatment schedule. This eliminates costly and time consuming repeat trips at short intervals.

And of course, in the treatment of milk-producing animals the "withdrawal period" is an important economic factor—milk from dairy cows treated with Erythrocin Injectable Veterinary is *free from antibiotic residue within 48 hours after treatment.* This means milk from animals treated with Erythrocin can be marketed earlier than that of animals treated with some other antibiotics.

Low Toxicity . . . Quick Action . . . Proven Safety

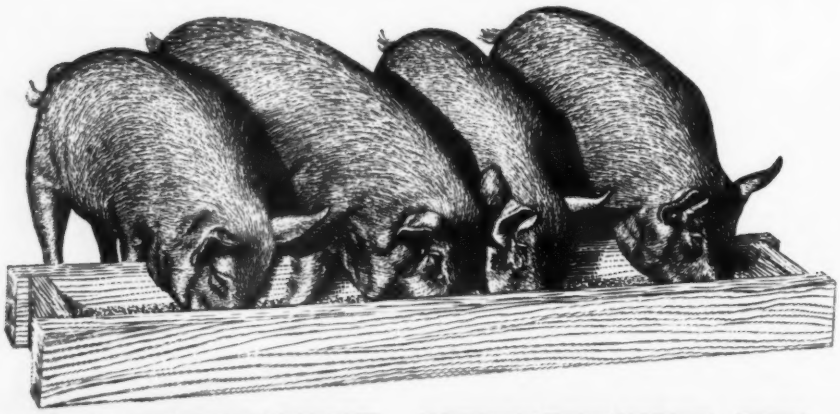
In clinical trials on many types of disease conditions, investigators reported no significant side effects or toxic manifestations as a result of treatment with Erythrocin Injectable Veterinary. With Erythrocin Injectable you may expect effective blood levels in one to two hours. And clinical investigators were uniform in their confidence in the safety of Erythrocin Injectable in veterinary use.

For quick action, for safety, for low cost, and for short withdrawal period, keep Erythrocin Injectable Veterinary on your shelves and in your bag at all times. You'll be glad you did.

ERYTHROCIN—Erythromycin, Abbott.

104211

ABBOTT



GWY-VITA

a superior formulation that combines the best qualities of...

EXPECTORANT

STIMULANT

VITAMIN SUPPLEMENT

treatment of choice for:

- * PNEUMONIA
- * INFLUENZA
- * BRONCHITIS
- * SHIPPING FEVER
- * LARYNGITIS
- * UPPER RESPIRATORY DISEASES

A proved formulation—combines qualities of expectorant, stimulant, vitamin supplement. Gives all the benefits of guaiacol, ammonium chloride and iodine, plus the replenishing of vitamins. Much more effective than guaiacol alone. Early improvement is marked following treatment for upper respiratory diseases of swine. An excellent supportive treatment for bovine shipping fever and related shipping fever complexes.

each pound contains:

Ammonium Chloride	40%
Available Iodine	4½%
Potassium Guaiacol-Sulfonate plus palatable base	54½%
Vitamin A	400,000 units
Niacin	2,270 mgs.
Riboflavin	200 mgs.
Thiamine Mononitrate	200 mgs.
Pyrodoxine HCl	200 mcgs.
Vitamin B_{12} Activity	300 mcgs.
Folic Acid	20 mcgs.
Calcium Pantothenate	250 mcgs.
Choline	20 mcgs.

PACKAGED: 12 1-lb. ★

dosage is easy...

Add to drinking water, and allow no other water during treatment. Mix 1-lb. GWY-VITA to 1 gal. water to make stock solution. Swine: ½ to 2 pints of solution to each 25 gallons drinking water. Cattle: 1 pint of solution to each 12-15 gallons of drinking water.

1721 Baltimore Ave.
Kansas City 8, Mo.

THE NATIONAL LABORATORIES CORP.

Affiliated BIOLOGICS

Serving the Graduate Veterinarian exclusively

New GAINES GRAVY TRAIN ends your "fussy-eater" problem!

SAVE $1.50 on every 100 lbs. you buy!

Gravy Train has a beef-tasty flavor that sharpens appetites and keeps them sharpened. What's more, this high palatability is combined with 22 vitamins and minerals and 10 different proteins—a complete balanced diet. Now you can feed Gravy Train and save money too, through the Gaines Kennel Plan. Send the coupon today for complete details!

Box V13, Gaines Professional Service Dept.
275 Cliff St., Battle Creek, Mich.

Gentlemen:
Please send me my Gaines Kennel Plan application blank which explains how I can save $1.50 on every 100 lbs. of Gravy Train or Gaines Meal.

Name_____

Address_____

City_____ State_____

Offer not good in Kansas or outside U.S.A.

BREAK THROUGH THE EARWAX BARRIER WITH SEBUMSOL™

(hexamethyltetracosane, 'PARLAM')

□□□ ideal new cerumenolytic agent

Only 1 dropperful of a safe, new drug now offers greater success in ear diagnosis and therapy. Called 'SEBUMSOL', it provides deep penetration of waxy deposits and thoroughly cleans the ear canal without irritation.

'SEBUMSOL' cleans better because it mixes so freely with sebaceous and cerumenous secretions. Loosens and dissolves hard, deep-seated wax and fatty deposits; floats them to the surface where they can be quickly and easily wiped away.

Traditional cleansing agents employ foreign materials that attempt to perform by chemical or mechanical action. 'SEBUMSOL' relies entirely on its natural physical action for its therapeutic activity.

In recent controlled tests on 550 dogs and cats, 95% good to excellent results were obtained with easy to use 'SEBUMSOL.'

Non-irritating, non-allergenic, non-anaphylactic. No residue. No hair discoloration. Completely safe.

'SEBUMSOL' complements . . . does not complicate any additional therapy which may be required.

□□□ without anesthetics or instruments

INDICATIONS:

(1) **Removes excess or impacted earwax.**

(2) **As a pre-treatment. Removes "cerumen barrier." Enhances effectiveness of any additional therapeutic measures.**

(3) **Cleans the ears; facilitates aural examination and diagnosis.**

(4) **Relieves otitis externa, itching and pain, due to excessive cerumen.**

SUPPLY: 'SEBUMSOL' is available in 1 fl. oz. dropper bottles with dispensing label; also pint bottles for hospital use. **Low priced for routine use.**

TARGET POINT CHEMOTHERAPY

Parlam CORPORATION

Write for samples and literature.

266 South Dean Street • Englewood, New Jersey

CANADA: Veterinary Medical Supply Co. of Canada, 4700 Prince of Wales, Montreal

"Pioneer in veterinary medicine for target point chemotherapy"

To Control Excitement in Large Animals

INJECTION

Sparine®

HYDROCHLORIDE

Promazine Hydrochloride, Wyeth

In large animals, SPARINE controls excitement, tension, and unruly tendencies without "knocking out" the animal. SPARINE reduces struggling and risk of injury to animal and to you.

In a study reported in the Journal of the A.V.M.A., SPARINE was used to calm horses undergoing a variety of treatment; ". . . results were satisfactory, not only from the standpoint of the patient's response, but also to the operator and owner."*

SPARINE HELPS MAKE YOUR JOBS EASIER:

physical examinations
x-ray procedures

dentistry

otoscopic procedures
minor surgery

For further information on prescribing and administering SPARINE see descriptive literature, or current Direction Circular.

*Dawson, H.A.; Lickfeldt, W.E., and Brengle, L.A.: J. Am. Vet. Med. Assoc. *135*:69 (July 1) 1959.

Wyeth Laboratories Philadelphia 1, Pa.

Wyeth® SERVICE TO MEDICINE

DOCTOR...
DO YOU VACCINATE OR IMMUNIZE?
(THERE'S A DIFFERENCE!)

WITH BALDWIN HOG CHOLERA VACCINE
you get ASSURED MAXIMUM IMMUNITY!

HERE'S WHY: TITRATIONS

- Product titrations (dilutions) of each serial of vaccine are made to determine and insure the concentration of modified live virus contained in each dose.

This concentration of virus must meet exacting standards as determined by two years evaluation studies at Baldwin Laboratories, of the modified live virus requirements for **assured maximum immunity in swine.**

HERE'S WHY: S.P.F. PIGS

- Further safety in immunization with Baldwin vaccine is assured by the injection of each serial of vaccine into ideal biological filters . . . **S.P.F. pigs.**

- **You do not have to test Baldwin vaccines in the field.**

BON-EVAC (Porcine Origin)
BON-EVINE (Rabbit Origin)
(BOTH FOR USE WITH SERUM)

B

SOLD ONLY TO GRADUATE VETERINARIANS
Products of Professional Choice
BALDWIN LABORATORIES, INC. • OMAHA 8, NEBR.
"SERVICE ON A PROFESSIONAL LEVEL"

Now! From the Hunt Club Laboratories and Test Kennels...

A BETTER DOG FOOD THAN EVER BEFORE!

At Last, Every Dog Under Your Care Can Have Total Nutrition With Quick Assimilation When Fed New Burgerbits Dog Food!

HERE'S WHY—

DEXTRINIZED—Hunt Club's dextrinizing process turns starches into easier-to-digest dextrins . . . helps assimilation of *all* the food value.

APPETIZED—Burgerbits is made with meal processed from plenty of lean red meat and "appetized" with animal fat to provide True Meat Taste.

FORTIFIED—Burgerbits formula of meat meal, vegetables, whole grain, and bone meal is further enriched by the addition of vitamin and mineral supplements.

PRESSURE PROCESSED—Burgerbits ingredients are pressure cooked to seal in the delicious flavor.

BURGERBITS Offers You Trouble-Free Handling! It mixes quickly and easily with the liquid of your choice. It holds its shape, won't become "mushy" . . . Burgerbits stays firm and crunchy. You'll appreciate the fact that Burgerbits won't "set-up" or stick to feeding pans . . . saves time, labor and trouble!

NO DISTURBANCE FROM CLINIC TO HOME FEEDING

The same fine Burgerbits you feed the dogs under your care is available to your clients at their local supermarkets . . . under the same famous name! By feeding Burgerbits and recommending it to your clients, you can avoid the upsets (and complaints) that so frequently accompany a switch from one food to another!

Hunt Club

Another Fine Product of
STANDARD BRANDS INC.

Burgerbits®
DOG FOOD

PORSIBAC* **1**

Mixed Bacterin (Porcine)
Formula 1

PORSIBAC 2

Mixed Bacterin (Porcine)
Formula 2

. . . the two
newest members of
Fort Dodge's growing family of

BIOTIZED* bacterins

concentrated . . . standardized

. . . labels guarantee each 2 cc. dose

contains 15 billion microorganisms

(harvested during the active growth phase)

Also—
BOVIBAC* 1, 2 and 3
and FORTIBAC*. . . with
others in preparation.

exclusively FORT DODGE®

*Trademark, Fort Dodge Laboratories

Vol. 138

No. 8

April 15, 1961

Journal

OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

Rehabilitation of Dogs with

Intervertebral Disk Lesions

by Physical Therapy Methods

WALTER J. JADESON, M.S., R.P.T.

I. Basic Aspects of Disk Lesions in Dogs

LESIONS of the intervertebral disks are common in both man and animals. In dogs, thoracolumbar disorders are treated by surgical excision or by conservative means, mainly various types of medication. Recently, physical therapy methods have been developed as an adjunct to other conservative procedures, and it is the aim of this study to investigate their value in the rehabilitation of disabled animals.

Pathology

Bulging or protrusion of the disk occurs when the annulus fibrosus is weakened but still encases the nucleus pulposus or when, following a rupture of the annulus, the nucleus is confined by the dorsal longitudinal ligament.[2] In rupture of the disk, the nucleus pulposus herniates through a tear in the annulus fibrosus and often presses on the spinal nerve roots at the points of exit from the intervertebral foramina. Edema of the nucleus pulposus may cause protrusion in man, but it is doubtful if this occurs in dogs without previous trauma. The term "slipped disk," correctly applied, refers to prolapse of the whole disk with resultant compression of the spinal cord. This lesion develops only as a consequence of severe trauma, whereas others may be due to degenerative processes.

Calcification of the disk is one of these degenerative processes and is so widespread in both man and dog that it is sometimes considered normal.[8] Factors responsible for early degeneration of intervertebral disks include: physiologic changes; defective, abnormal, or weak development of the tissues; kyphosis; and incomplete closure of the embryonic chordal canal. The so-called "chondrodystrophoid" dogs—Dachshunds, French Bulldogs, Pekingese, and Spaniels—have a predisposition toward early calcification of the disk, often within the first year of life.[1]

The author is a registered physical therapist, Hollywood Medical Center, Los Angeles, Calif.

This report is a condensation of a thesis which fulfilled, in part, requirements for the Master of Science degree at the University of California at Los Angeles.

It is generally agreed that degeneration is the underlying cause of most disk lesions. In the course of degeneration, the nucleus pulposus undergoes dehydration, losing some of its elasticity and, as a consequence, its effectiveness as a shock absorber. Excessive strain is thus placed on the annulus fibrosus and on adjacent groups of muscles and ligaments, with the result that the spinal column becomes unstable and increasingly vulnerable to trauma.[7]

Aside from automobile accidents, gunshot wounds, and other external forces, injury resulting in disk lesions occurs most frequently while running or jumping, *i.e.*, when the spinal column is placed in overflexion, overextension, or abnormal torsion. In many cases, the exact moment of injury cannot be determined, especially in dogs of the chondrodystrophoid group.

The accurate incidence of disk involvements is difficult to determine because many afflicted dogs—and man—do not develop clinical signs. In the absence of surgery or myelograms, diagnosis is not always conclusive.

In a series of 130 necropsies of dogs that had died or had been euthanatized for conditions other than disk lesion, 41.5% had disk protrusions and, in more than 75% of this group, multiple disk lesions were found. Protrusion of the disk was encountered in 63.0% of the dogs 5 years of age or older.[2]

Disk lesions occur most frequently in dogs between the ages of 3 and 7 years, except in the chondrodystrophoid group.[1] In these, protrusions occur as early as the first year; the incidence is markedly higher, and the tendency for multiple lesions and relapses to occur is much more pronounced.

Disk lesions most often involve the lower thoracic and anterior lumbar regions, probably because this part of the spine is subjected to the greatest functional stress. Lesions are more likely to develop in a dorsolateral plane due to the fact that the annulus fibrosus is thinner dorsally.[4] Owing to the greater medial thickness of the dorsal longitudinal ligament, medial herniations are rare.

Clinical Signs

Signs of intervertebral disk disorders in the thoracolumbar region range from mild discomfort to severe pain and from slight stiffness to complete paralysis of the hindlegs.[5] Due to the fact that, in the dog, the spinal cord extends to the 7th lumbar vertebra, the signs of lesions at the thoracolumbar level are much more severe than in man.

Signs differ depending on which neural structures are affected. If a prolapsed disk compresses the spinal cord, signs are observed at or below the level of the lesion.[3] If, in contrast, a portion of the disk protrudes into an intervertebral foramen and impinges on the nerve root passing through it, the signs occur only at the level of the lesion. In this latter case, exacerbations and remissions are frequent, depending on the dog's ability to compensate for focal pressure.[3]

Usually both the sensory and the motor systems are involved. Although it is not possible to establish numbness and tingling as in man, a sensory loss can be detected in dogs during examination.

In the presence of mild to moderate disk lesions, dogs develop rigidity, abnormalities of curvatures, such as scoliosis or kyphosis, and spasm of the back muscles, usually combined with hypersensitivity in the involved area. To avoid discomfort, the dog is often reluctant to move. Pain is most pronounced upon backward extension of the hindlegs. It is also noticeable when the dog is picked up under the axillae and generally accompanied by hyperextension of the forelegs—a manifestation of the Schiff-Sherrington phenomenon.[4]

In severe cases, especially if there is compression of the spinal cord, varying degrees of paralysis occur caudally to the level of the lesion, trophic functions are decreased, and the reflexes are depressed or completely absent. This leads to urinary and fecal retention or incontinence. The primary nerve lesion is also partly responsible for the frequent development of trophic and decubitus ulcers, cystitis, and gastritis.

Following protrusion or herniation of a thoracolumbar disk, there is an initial stage of spinal shock, after which the anterior portion of the dog's body is normally active. Spinal reflexes of the hindlegs may return at a later date, but they usually remain abnormal and are often exaggerated.[4]

In exceptional cases of herniation of a thoracolumbar disk, diffuse hemorrhagic involvement of the spinal cord produces progressive ascending paralysis subsequent to

paralysis of the tail, croup, and hindlegs. With extension of the paralysis to the thorax, the animal dies from respiratory failure.

Degenerative changes of the intervertebral disk, such as calcification, produce a lesser degree of disability. There is pain, aggravated by movement, and the animal tends to hold its back in a rigid position, resulting in an unnatural gait.[5]

Disappearance of signs and spontaneous recovery are common and may be due to a number of reasons. The spinal cord is able to compensate for abnormal pressure and, up to a point, can adapt itself to the altered space.[6]

Most authors believe that such improvement takes place only with protrusion of the disk, in which the intact annulus fibrosus bulges into the spinal canal. In lesions of this type, the damage is often mild and signs may disappear after hemorrhage and edema have been absorbed—a process which usually takes 10 to 21 days but occasionally will extend over a period of 4 to 6 months.[4] Following rupture of the annulus fibrosus and escape of the nucleus pulposus, no lasting improvement can be expected as a general rule. The ruptured disk may be replaced by a connective tissue scar, but such healing is at best incomplete and signs recur with comparatively little stress.

Intermittent acute symptoms are explained by progressive degrees of disk protrusion or by a shift of the herniated mass to involve different nerve roots.[6] One must also take into consideration that a new injury to the same or a different disk may have occurred.

Diagnosis

The diagnosis of lesions of the intervertebral disk is not infallible. The clinical signs are similar to those caused by other lesions affecting the nervous supply of lower back and hindlegs, namely, neoplasms, concussion or contusion of the spinal cord, fracture dislocation, spina bifida, syringomyelia, meningitis, myelitis, rheumatoid spondylitis, hypertrophic arthritis, or toxicopathic conditions.

Age and breed of the dog and his clinical history provide important clues. Whenever possible, the record should include the owner's observations regarding the dog's recent behavior and the time of onset of the disability. In addition to a thorough general physical examination, specific neuromuscular studies, such as tests of the reflexes and of muscle strength, may be indicated. Distinction between the various types of paralysis may be useful in localizing the lesion, although such an inference is not always conclusive. According to one author:[4]

> Flaccid paraplegia generally intimates cord involvement in the middle or lower lumbar region. Paraplegia in extension (spastic, according to some clinicians) in which the hind limbs extend forward under the body or to one side of the body, is noted with more rostral (thoracic-anterior lumbar) protrusions and localized cord pathology. Reflex examination may suggest the site of the herniation in these cases. The type of paraplegia, however, will not always localize the involved disc for there may be a variation of cord pathology, both in degree and location.

Radiographs, although helpful, are not conclusive. The disk itself is not visible unless it is calcified. The diagnosis cannot be based solely on the so-called "indirect signs," such as narrowing of disk space, calcification, spur formation, or abnormal curvature of the spinal column. Demonstration of a narrow disk space, with or without calcification, would be significant if it occurred in an area of superficial pain, as would a calcified protrusion or intervertebral foramen.[3] However, radiographs are of definite value in ruling out other conditions producing similar clinical signs. Myelograms are indicated only if surgical intervention is planned. Laboratory tests should be ordered if the differential diagnosis remains in doubt.

References

[1]Hansen, H. J., and Olsson, S. E.: The Indications for Disc Fenestration in Dog. Proc., 15th Internat. Vet. Cong., Stockholm, Aug. 9-15, 1953, I, (1953): 938-943.

[2]Hoerlein, B. F.: Intervertebral Disc Protrusions in the Dog. Am. J. Vet. Res., 14, (April, 1953): 260-283.

[3]Hoerlein, B. F.: Further Evaluation of the Treatment of Disc Protrusion Paraplegia in the Dog. J.A.V.M.A., 129, (Dec. 1, 1956): 495-502.

[4]McGrath, J. T.: Neurologic Examination of the Dog. Lea & Febiger, Philadelphia, 1956.

[5]Merck Veterinary Manual. Merck & Co., Inc., Rahway, N. J., 1955.

[6]Olsson, S. E.: On Disc Protrusion in Dog. Acta ortop. scand., suppl. 7, 1951.

[7]Riser, W. H.: Posterior Paralysis Associated with

Intervertebral Disc Protrusion in the Dog. North Am. Vet., 27, (Oct., 1946): 633-642.

[5]Schlotthauer, C. F.: The Nervous System. In *Canine Medicine*, Hoskins, H. P., Lacroix, J. V., and Mayer, K. (ed.). American Veterinary Publications, Inc., Evanston, Ill., 1953.

II. Review of Treatment Methods

MANY METHODS and techniques for treatment of disk disorders have been utilized in veterinary medicine. The most effective plan for treatment of disk disorders in dogs has not yet been determined.

Surgical Management

The most commonly used operative procedures are laminectomy,[6] with or without fusion of the vertebral bodies, and fenestration. The questions of selection of the most suitable cases and of timing of the operation are still controversial. Surgery as soon as possible after the injury, within 3 to 5 days if paralysis and allied neuropathies are profound, has been recommended.[3] In such cases, pressure may cause irreversible damage unless it is quickly relieved. In contrast, other investigators[1] have not advocated surgery in the presence of severe injury, maintaining that under these circumstances irreparable damage to neural structures has occurred. They recommend surgical intervention for dogs with slight or moderate signs provided that conservative treatment failed to produce results. Even among the advocates of delayed surgery, there is little agreement on how long to wait for signs of improvement from conservative treatment or for spontaneous recovery.

Conservative Treatment

Conservative treatment of intervertebral disk lesions is the method preferred by the majority of veterinarians in general practice. The conservative approach aims at facilitating natural healing, especially by rest and proper care.[5] There is general agreement on the advisability of heat and immobilization during the acute period. Because of the danger of doing further damage to an already injured disk by subjecting it to sudden stress, manipulation is not advised until the acute stage has subsided. At this time, other physical measures may be tried, such as electrical stimulation, exercises, braces, and supports. Ultrasonic therapy has been effectively used in the treatment of man[7] and has been introduced into veterinary medicine.[4]

Supportive medication aims at improving the dog's general condition and relieving pain and discomfort. For this purpose, drugs are selected from the following categories: nerve and metabolic stimulants, nutritional adjuncts, sedatives, and antispasmodics. The following medications are considered useful for this phase of conservative treatment:[2] (1) B complex vitamins, especially thiamine hydrochloride; (2) calcium gluconate and other calcium salts; (3) thyroid and calcium preparations; (4) salicylates orally; (5) cinchophen; (6) physostigmine; (7) barbiturates; and (8) antispasmodics.

Other treatment methods which have proved effective in the conservative management of intervertebral disk lesions are:[2]

1) Rest, small cage, quiet surroundings.

2) Maintenance of micturition by expression or catheterization and defecation by mild laxatives or enemas.

3) Prevention of decubital sores and skin irritation by keeping skin clean and clipped and by use of various protective ointments.

4) Physical therapy, especially moist heat with passive massage to relax muscles and to stimulate circulation.

5) Support, such as carts, to encourage movement in dogs with chronic cases.

6) Maintenance of optimal nutrition by high protein diet, intravenous protein-dextrose solutions, and general nursing care.

7) Prevention of secondary infections such as nephritis, cystitis, pulmonary congestion and pneumonia, and systemic diseases such as distemper.

Results of a Survey of Practitioners

Information on the treatment methods most widely used in general practice in one area was obtained by sending a questionnaire to 50 small animal hospitals, selected by the Los Angeles County (Calif.) Veterinary Medical Association. Thirty-one replies were received and tabulated.

The total number of dogs covered by the reports amounted to 682, with the yearly case load per hospital ranging from 4 to 30, or an average of 22 cases per year.

TABLE 1—Results of Treatment of Paralytic and Paretic Dogs in 31 Hospitals

Grade of improvement	No. of dogs	Percentage
Excellent	338	49.56
Good to moderate	164	24.05
None or worse	180	26.39
Totals	682	100.00

Treatment procedures have been compiled under 6 general categories.

1) Nutritional adjuncts and aids to greater physical resistance: glucose intravenously; vitamins, predominantly B complex and B_{12}; calcium; forced feeding; antibiotics.

2) Sedation, pain reduction, and muscle relaxation: cage rest; homatrophine methylbromide, atropine SO_4; salicylates, barbiturates, other analgesics, sedatives, or both; antispasmodics.

3) Mechanical or pharmacologic control of elimination: catheterization and mechanical stool elimination, enemas and colonics, diuretics, laxatives.

4) Specific drugs: ACTH, cortisone or steroid derivatives, physostigmine.

5) Physical therapy: hydrotherapy, massage, heat treatments, manipulations.

6) Other treatment procedures: taping, corset, plaster cast, cart, surgery.

Treatment was carried on for periods ranging from 6 days to 3 months (av. 26 days).

Results of treatment were reported by 31 hospitals for 682 dogs (Table 1).

Physical therapy was utilized in only 6 of the reporting 31 hospitals surveyed and, in those, the methods were restricted to heat treatments, hydrotherapy, massage, and manipulations. Rarely was more than one modality of physical therapy applied. Still, the addition of physical therapy to conventional conservative treatment methods is reflected in improved results (Table 2).

Although this difference in results is not striking, it suggests that greater benefits could be obtained by using further techniques of physical therapy to supplement the standard methods of conservative management.

TABLE 2—Results of Treatment of Paralytic and Paretic Dogs by Supplementary Physical Therapy (6 Hospitals, 94 Dogs)

Grade of improvement	No. of dogs	Percentage
Excellent	54	57.45
Good to moderate	22	23.40
None or worse	18	19.15
Totals	94	100.00

Summary

There is no agreement as to the most effective treatment plan for disk lesions. With regard to surgical management, selection of cases and timing of the operation are still controversial. A number of treatment methods for the conservative management of disk lesions are outlined. A survey of 31 small animal hospitals was undertaken in order to determine which methods are most frequently used and to evaluate their benefits. Supplementary physical therapy, applied by only 6 hospitals, was reflected in improved treatment results.

References

[1]Hansen, H. J., and Olsson, S. E.: The Indications for Disc Fenestration in Dog. Proc. 15th Internat. Vet. Cong., Stockholm, Aug. 9-15, 1953, I, (1953): 938-943.

[2]Hoerlein, B. F.: The Treatment of Intervertebral Disc Protrusions in the Dog. Proc. Book, AVMA (1952): 206-212.

[3]Hoerlein, B. F.: Further Evaluation of the Treatment of Disc Protrusion Paraplegia in the Dog. J.A.V.M.A., 129, (Dec. 1, 1956): 495-502.

[4]Norton, W. E.: Physical Therapy in Small Animal Practice. Am. Anim. Hosp. A., Committee Reports (1956): 40-43.

[5]Olsson, S. E.: On Disc Protrusion in Dog. Acta orthop. scand., suppl. 7, 1951.

[6]Redding, R. W.: Laminectomy in the Dog. Am. J. Vet. Res., 12, (April, 1951): 123-128.

[7]Van Went, J. M.: Prolapse of Intervertebral Discs Treated with Ultrasonic Waves. Brit. J. Phys. Med., N.S., 15, (May, 1952): 120-121.

III. A Pilot Study of the Effect of Physical Therapy

A CONTROLLED STUDY of dogs with intervertebral disk lesions was undertaken to determine whether modalities of physical therapy as adjuncts to conventional treatment methods would result in a higher rate of improvement.

Material and Methods

The facilities of a small animal hospital were made available for the investigation.

A total of 82 dogs were treated during 26 months; 69 were Dachshunds and the oth-

ers were Cocker Spaniels and dogs of mixed breeds.

Only dogs with paresis or paralysis of the hindlegs due to low thoracic or lumbosacral disk lesions were included. The diagnoses were made by the 2 veterinarians in charge of the hospital and, in cases in which the dog died or was euthanatized during the investigation, the diagnoses were verified by necropsy. The physical and neurologic findings were classified as paralysis in 44 dogs and as paresis in 38.

For the purposes of this study, the dogs were allotted at random to 2 groups (group 1 and group 2). All dogs were given the same conservative treatment, but the 47 dogs in group 2 were given, in addition, various types of physical modalities as indicated.

Only dogs in the acute phase, *i.e.*, no more than 4 days after onset of clinical signs, were chosen for this study. Conventional treatment and nursing care were started immediately after admission to the hospital. Among the dogs in group 2, physical therapy was begun as soon as possible —in those with paresis, this was usually soon after admission; in those with paralysis, after danger of spinal shock had subsided and the general condition of the dog was stabilized.

In both groups, treatment was continued for 4 weeks unless full recovery occurred earlier. If the dog had not fully recovered in this time but his response indicated that further treatment might be beneficial, the period of treatment was extended—in exceptional cases up to 3 months. The dogs were examined 2 weeks after termination of treatment and, thereafter, approximately every 2 months for 12 months.

Treatment Procedures

Conventional medical treatment was administered to both groups of dogs and consisted of:

1) *Nursing Care.*—Attention was given to proper positioning and frequent turning of cage-bound dogs to prevent or minimize contractures, skin irritations, and decubitus ulcers. Soft underpadding and towels were used to keep the dog comfortable and warm. Urinary retention was managed by manual expression of the bladder or catheterization. Urinary antiseptics were given as required. Fecal evacuation was accomplished by rectal stimulation, enemas, suppositories, or laxatives. An adequate daily intake of water and food high in protein was maintained.

2) *Muscle Relaxants.*—For symptomatic relief, muscle relaxants, given by mouth or by injection, and antispasmodics were used.

3) *Corrective Therapy.*—Corrective therapy was instituted to guarantee a high level of physical resistance and general health: ACTH or injectable prednisolone was given, followed by daily maintenance doses of cortisone derivatives; antibiotics were given to prevent secondary infections; multiple vitamins, particularly B complex and vitamin D, were given to control possible nutritional deficiencies, and vitamin B_{12} for its neurotrophic action.

Conventional medical treatment of dogs suffering from paresis was usually restricted to cortisone derivatives in tablet form, vitamin therapy, and foods high in protein, with the addition of muscle relaxants in some cases.

Physical therapy modalities used for dogs in group 2 included:

1) *Thermotherapy.*—Application of heat produces dilation of the blood vessels, increases the volume and rate of circulation, and thus improves tissue metabolism. Heat was used as an adjunct to other modalities to reduce edema, relieve pain, and relax muscle spasm.

Three types of thermotherapy were employed: infrared irradiation as a preliminary to massage, exercise, stretching, and ultrasonic therapy; moist heat fomentations for severe muscle spasms or contractures; warm water baths to facilitate exercises and stimulate muscle reaction.

2) *Massage.*—Manipulation of the soft tissues increases the blood supply, resulting in higher tissue metabolism. In atrophied or paralyzed muscles, massage partially compensates for the lack of normal activity. In combination with passive exercises and electrical stimulation, it helps to loosen adhesions, restore vasomotor tone, and accelerate circulation.

3) *Exercises and Stretching.*—The exercise program was designed to strengthen weak muscles or muscle groups, to prevent stiffness and deformity, and to maintain

Fig. 1—Infrared and ultrasonic therapy consisting of mild heat treatment followed by paravertebral sonation of thoracolumbar region.

or regain normal range of motion. Reflex action was utilized whenever possible in order to encourage neuromuscular re-education. All forms of exercise were used, *i.e.*, passive, active-assistive, active, and resistive, depending on the condition of the dog.

Practice in standing and balance as well as gait training are important in exercise therapy and often require specially designed carts or carriages. In such a cart, a dog assumes an anatomically correct posture which facilitates metabolic and other body functions. With this help, reflex activity of the hindlegs is encouraged, and the dog is enabled to utilize any residual motor function. When he no longer drags his hindlegs, the incidence of skin irritations and ulcers is reduced. Daily workouts in the cart counteract other detrimental effects of immobilization, such as contractures, and tend to improve the general condition and disposition of the dog.

The use of the carriages was dincontinued as soon as the dog's hindlegs could bear weight. Intermediate measures included splints and bandages and slings for dogs that were capable of locomotion but whose hindlegs were still too weak for full weight-bearing.

4) *Electrical Stimulation.*—Application of an electrical current serves as a temporary substitute while natural physiologic impulses are absent. Electrical stimulation is yet another means of inducing contractions of intrinsic muscles, promoting deep circulation, and maintaining tissue vitality, but it is superior to massage and exercises in eliciting neuromuscular responses. It is an important tool for neuromuscular re-education.

5) *Ultrasonic Therapy.*—No other modality is as important as ultrasonic radiation in the treatment of disk lesions. The physiologic effects of ultrasonic energy on living tissue have been fully described elsewhere.[1,2] Briefly, the changes produced by high frequency sound waves may be attributed to 4 interrelated factors:[3] (*a*) mechanical—high frequency vibrations produce a pulsating action in tissues and cells; (*b*) thermomechanical—heat is induced within the tissues by the transition of ultrasound waves through interfaces, *i.e.*, at the junction of soft tissue planes; (*c*) biochemical—inter- and intracellular changes

Fig. 2—Electrical stimulation is given to muscles of the back of a Dachshund.

Fig. 3—Electrical stimulation to muscles of dog's hindleg.

Fig. 4—Mild stretching of affected muscles of hindleg to minimize contractures and adhesions.

Fig. 5—Bicycle exercise is an example of progressive exercise program.

are produced which result in stimulation of cell metabolism; (*d*) neurotrophic—physiologic reactions take place outside the ultrasonic field and are caused indirectly (via reflex arcs) by sonation of roots of autonomic nerves.[5]

In this series, ultrasonic radiation was applied at 2 different sites: over the muscles or muscle groups paralyzed or weakened as a result of disk lesions, and over the lesion itself and the surrounding area. Sonation of the affected muscles benefits them by deep micromassage of the cells, thereby increasing muscular permeability and intercellular metabolism. This results in better nutrition, relief from pain, and reduction of muscle spasm. Application of ultrasound to the area of the lesion seems to have a double effect. The hypertony of the lumbar muscles is reduced and, with restoration of muscular function, the protruded nucleus pulposus tends to return to its normal position. Furthermore, ultrasound waves break up tissue particles and promote the absorption of exudates and precipitates, and it was assumed that herniated disk material would be similarly affected. While this property of ultrasonics has been demonstrated in various experiments, its effectiveness in the treatment of intervertebral disk lesions has not yet been substantiated.

Several of the described modalities of physical therapy produce similar physical and physiologic effects. Yet one single measure is often insufficient to bring about a significant improvement, and it takes the combination of several modalities supporting each other to achieve functional restoration and optimal recovery. For example, heat increases circulation, improves nutrition, and relieves pain and muscle spasms. However, these effects are temporary and will not prevent atrophy or result in strengthening the muscles. When massage, exercise, or electrical stimulation is added, the benefits of thermotherapy are enhanced by further acceleration of circulation and also by increase of muscle tone. In like manner, preparatory application of heat facilitates manipulation and permits more intensive massage and exercise.[4]

Schedule of Physical Therapy

Recovery from intervertebral disk lesions is gradual and progressive. Therefore, the

physical therapy program was stepped up as the dog's condition warranted and slowly tapered off again when signs of recovery became evident.

The same modalities were used for dogs with paresis and with paralysis but on a slightly different schedule. Those with paresis were immediately put on a complete regimen, consisting of infrared irradiation, substituting or adding warm water baths for more severe cases; massage to the low back and hindlegs; mild stretching; active and resistive exercises; ultrasonic therapy; and standing and gait training. Electrical stimulation was applied to individual muscles or muscle groups which did not respond to these measures. Treatments were given 3 times a week, with the number of treatments and the selection of modalities adjusted to the dog's rate of recovery.

The treatment schedule for dogs with paralysis was much more gradual. Initially, most of the dogs suffered from spinal shock and only those modalities were applied which would not aggravate the condition. Mild infrared irradiation, superficial sedative massage to the hindlegs, and ultrasound of low intensity were administered (Fig. 1). Severe muscle spasm was alleviated by moist heat fomentations. Exercise therapy was limited to slow passive movement of the hindlegs, sufficient to counteract contractures and insure free range of joint motion. Treatment was given daily for relatively short periods to avoid additional strain on the dog's physical reserves.

As soon as the dog's condition permitted, the program was accelerated. Heat treatments were continued. More active exercises were added and frequently performed in a warm water bath. Massage techniques were modified to include deep manipulation of the soft tissues. Intensity and duration of ultrasonic therapy were increased and supplemented by electrical stimulation of the muscles of the back and hindlegs (Fig. 2 and 3).

Once steady improvement was achieved, the number of treatments was gradually reduced to 3 times a week. When signs of adhesions or joint contractures appeared, mild stretching was included with the aforementioned modalities (Fig. 4). As soon as deep reflex motion had returned, electrical stimulation was gradually replaced by exercise therapy, first using reflex action and then, as improvement continued, adding active and resistive exercises to further strengthen individual muscles and muscle groups (Fig. 5). By this time, the dog was usually able to stand with assistance and could be placed in a carriage for gait training (Fig. 6 and 7). Eventually the dog was taught to walk correctly without support. It was sometimes necessary to splint or bandage weak joints or to provide light support by means of a sling until the hindlegs became fully weight-bearing. At this point, all other modalities of physical therapy were terminated, but neuromuscular re-education and gait training were continued up to the time of discharge.

As a rule, dogs in group 2 regained normal or almost normal function within 3 weeks or not at all. Occasionally, however,

Fig. 6—Carriage for partially recovered dog is designed to give support during gait training.

Fig. 7—Another type of carriage, designed for larger dogs, permits greater freedom of motion for hindlegs.

TABLE 1—Results in Paralytic and Paretic Dogs Given Conventional Treatment Only (Group 1) and Those Given Conventional Treatment plus Physical Therapy (Group 2)

Group No.	Grade of improvement	Dogs with paralysis (No.)	(%)		Dogs with paresis (No.)	(%)		Total (No.)	(%)	
Group 1	Excellent	9	50.00	72.22	10	58.82	82.35	19	54.28	77.14
	Good	4	22.22		4	23.53		8	22.86	
	None	5	27.78		3	17.65		8	22.86	
		18	100.00		17	100.00		35	100.00	
Group 2	Excellent	18	69.23	85.46	15	71.43	90.48	33	70.21	89.36
	Good	5	19.23		4	19.05		9	19.15	
	None	3	11.54		2	9.52		5	10.64	
		26	100.00		21	100.00		47	100.00	

recovery took much longer. To illustrate this point and, at the same time, give a specific example of the treatment schedule followed in group 2, the case of a Miniature Dachshund, 4½ years old, is briefly summarized.

Case Report

When the dog was first seen, on Feb. 27, 1955, there was weakness of the lower back and hindlegs, with considerable pain and muscle spasms; the abdomen was tense and sensitive. On the previous day, the owner had observed stiffening of the hindlegs and a stilted gait. No history of trauma was reported, and the dog had been in excellent health.

Physical, neurologic, and radiographic examination suggested a diagnosis of prolapsed lumbar intervertebral disk (between L3 and L4). Within 24 hours, pain and rigidity disappeared and flaccid paralysis occurred with complete loss of reflexes, motor function, and sensory perception distal to L3. (Fig. 8). Medical care was immediately started and consisted of cage rest, daily injections of vitamin B complex and B_{12}, and cortisone 3 times weekly. Physical therapy for the first 4 days was restricted to mild infrared irradiation, low intensity ultrasonic therapy, and carefully controlled passive exercises of the hindlegs.

Fig. 8—Dachshund with posterior paralysis 24 hours after onset of clinical signs. In moving, the dog dragged its hindlegs.

Beginning with treatment day 5, the physical therapy program was extended to include 5 minutes of mild massage to the thoracolumbar region and the hindlegs, and mild galvanic stimulation to the muscles of the low back and hindlegs for 10 minutes. Ultrasonic therapy to the thoracolumbar region was increased to a dosage of 0.7 w/sq. cm. for 8 minutes,* applied paravertebrally and bilaterally. No change was observed up to day 12 when a mild cystitis developed which was controlled by antibiotics and diuretics. On day 15, a trace of sensory perception was observed in the affected area, accompanied by some reflex action, but no voluntary motor function was observed. From this time, elimination could almost always be accomplished by pressure to the abdomen and by rectal stimulation.

Physical therapy was reduced to 3 times a week, but passive exercises to the hindlegs were intensified to prevent muscle stiffness, atrophy, and joint contractures. Vitamin B_{12} was continued on a daily schedule; cortisone injections were replaced by ACTH given intramuscularly twice a week.

On day 24, the deep reflexes had become strong and the dog was able to stand with some assistance, but voluntary motor function was still absent. On the whole, the physical therapy program was continued unchanged, but infrared irradiation was shortened to 5 minutes and electrical stimulation replaced by manual stimulation of the reflexes. During each treatment session, the dog was placed in a

*In ultrasonic therapy, dose consists of intensity and duration. The intensity is measured either in total wattage output or in watts per sq. cm. of the soundhead crystal. The unit used in this case was provided by Dallons Laboratories, Inc., Los Angeles, and has a crystal surface of 10.0 sq. cm. The duration is always expressed in minutes.

specially designed carriage for about 10 minutes and taken for a short walk. By day 32, occasional uncoordinated movements of the hindlegs were observed, particularly when the dog was placed on his back or in the carriage, but it could not be determined whether these were due to reflex action alone or to trace voluntary motion.

The dog was returned to his owner with instructions to continute heat treatments, massage, and passive exercises. The owner brought the dog to the hospital twice weekly for routine medical checkups, vitamin B_{12} injections, and physical therapy; ACTH was injected once a week. Elimination was normal although involuntary, and the dog was able to stand without support if placed in the proper position. Except for a relapse lasting 4 days, normal function gradually returned. On day 40, all medical treatments other than a weekly vitamin B_{12} injection were discontinued. Physical therapy, once a week, was reduced to ultrasound and muscle re-education consisting of passive, reflex, and active exercises and assistance in walking.

Two weeks later, office treatments were stopped and the daily home exercise program was intensified. The dog was now able to walk most of the time although the movements of the hindlegs were not fully coordinated with those of the forelegs. Since residual weakness of the toe extensors remained, both tarsometatarsal joints were bandaged and taped to prevent stretching of the extensor tendons and to prevent skin irritation. Electrical stimulation was applied to the toe extensors each time the dog was brought in for the regular bi-weekly examinations. From then on, recovery was uncomplicated; 3 months after onset of clinical signs, the dog was able to walk almost normally and had regained full control of elimination. The dog is returned every 3 months for rountine examination and continues in excellent physical condition.

Results of Treatment

At the end of therapy, the dogs in both groups were re-examined and the results were graded (Table 1) according to the following degrees of improvement: (*a*) excellent (complete or almost complete recovery); (*b*) good to moderate (less pain, greater muscle strength, and improved motor function); (*c*) none or worse (this includes dogs with minimal improvement and those who died or had to be euthanatized).

The results were much better in dogs in group 2 in which physical therapy was combined with conventional treatment, than those in group 1 in which conventional treatment alone was used. In dogs in group 2, excellent improvement was obtained in 70.21% of cases against 54.28% in group 1. When both categories of improvement are considered together, the rate for dogs in group 2 is 89.36%, as compared with 77.14% for group 1. The addition of physical therapy increased the chances of improvement from about 3 out of 4 to almost 9 out of 10.

Most significant is the difference in dogs with paralysis. In dogs in group 2, excellent results were obtained in 69.23%, in contrast to only 50.0% in group 1. When over-all improvement is considered, combining the categories of excellent and good, all but 3 dogs in group 2, or 88.46% improved significantly whereas, with conventional treatment, the rate was 72.22%.

In dogs with paresis in group 2, there was excellent improvement in 71.43%; in group 1, excellent improvement in 58.82%. When the 2 categories of improvement are taken together, 90.48% responded favorably to conventional treatment with physical therapy, whereas 82.35% responded to conventional treatment alone.

Since this pilot study comprised only a limited number of dogs, the results were correlated with those from other hospitals which replied to the questionnaire (Table 2). To 375 dogs treated elsewhere, conventional treatment was given equivalent to that given to dogs in group 1 of the pilot study. The rate of improvement was almost the same in the other hospitals (75.73%) as in the pilot study (77.14% in group 1). The

TABLE 2—Results in Paralytic and Paretic Dogs Treated in 31 Other Hospitals

Grade of improvement	Conventional treatment			Conventional treatment plus physical therapy		
	No. of dogs	Percentage		No. of dogs	Percentage	
Excellent	189	50.40	75.73	54	57.45	80.85
Good	95	25.83		22	23.40	
None	91	24.27		18	19.15	
	375	100.00		94	100.00	

6 hospitals which used some physical therapy modalities in addition to conventional treatment reported 80.85% rate of improvement. With an integrated program of physical therapy as applied to group 2 in this study, the rate of improvement was still higher, amounting to 89.36%.

Other findings also suggest that the combination of physical therapy with conventional treatment is superior to conservative management alone. For example, the rate of recovery was more rapid in group 2 than in group 1. The mode rather than the mean of the rate of recovery was used because exceptional cases in all groups would otherwise distort the results (Table 3).

TABLE 3—Rate of Recovery of Dogs with Paralysis and Paresis (Mode)

Condition	Group 1	Group 2
Paralysis	21 days	16 days
Paresis	13 days	9 days

Because relapses are frequent, the health histories of dogs were studied for one year after termination of treatment. The percentage of those requiring renewed intensive treatment was much lower in group 2 than in group 1. In fact, there was not a single relapse among the dogs with paresis that had been treated with physical therapy modalities (Table 4).

TABLE 4—Incidence of Relapse in Dogs Treated for Paralysis and Paresis

	Group 1			Group 2		
Condition	Total No.	Relapses (No.)	Relapses (%)	Total No.	Relapses (No.)	Relapses (%)
Paralysis	13	4	30.77	23	1	4.35
Paresis	14	2	14.29	19	0	0.00

Pain was much less of a problem in group 2, and considerably smaller quantities of sedatives and analgesics were required. Since this study was not primarily concerned with drug therapy, the records are not sufficiently complete to furnish specific figures.

Conclusion

The evaluation of any treatment for intervertebral disk lesions is complicated by the frequency of spontaneous recovery. However, in this case, dogs were assigned at random to 2 groups. As a result, the rate of spontaneous recovery could be considered equal in both groups. Although the number of dogs treated in this pilot study was relatively small, certain conclusions can be drawn from the observations in this sample.

When physical therapy was combined with conventional conservative treatment, better results were obtained: A larger number of dogs with paralysis or paresis improved; recovery occurred much faster; there was less pain and less need for sedation; and incidence of recurrence was considerably lower.

Physical therapy is not meant to replace other treatment methods, including surgery, but is of greatest benefit when used as an adjunct to conservative methods. In this way, the dog is kept in optimal physical condition, and the return of normal function is facilitated whether recovery occurs spontaneously or is brought about by medical treatment.

Further investigations are needed to verify the findings and conclusions of this pilot study. It would also be helpful to evaluate the benefits of physical therapy for each of the various types of intervertebral disk lesions and to determine the optimal dosages and combinations of different modalities.

Summary

Eighty-two dogs were treated by identical conservative methods, but 47 of them were given, in addition, various types of physical modalities (thermotherapy, massage, exercises and stretching, electrical stimulation, and ultrasonic therapy).

In dogs given physical therapy combined with conventional treatment, excellent improvement occurred more frequently, particularly in dogs with paralysis. The rate of recovery was faster, the incidence of relapse was decisively lower, and there was less pain and consequently less need for sedatives and analgesics.

This pilot study suggests that physical therapy as an adjunct to conservative methods facilitates return of normal function to paralytic and paretic dogs.

References

[1]Aldes, J. H., and Jadeson, W. J.: Ultrasonic Therapy in the Treatment of Hypertrophic Arthritis

in Elderly Patients. Ann. West. Med. and Surg., 6, (Sept., 1952): 545-550.

[2]Jadeson, W. J., and McClintock, G. E.: Ultrasonics in Veterinary Medicine. North Am. Vet., 37, (March, 1956): 223.

[3]Lehmann, J. F.: The Biophysical Basis of Biologic Ultrasonic Reactions with Special Reference to Ultrasonic Therapy. Arch. Phys. Med., 34, (March, 1953): 139-152.

[4]Smith, E. M., and Strickland, B. A., Jr.: Clinical Axioms in Physical Medicine. South. Med. J., 41, (Sept., 1948): 844-847.

[5]Stuhlfaut, K.: Neural Effects of Ultrasonic Waves. Brit. J. Phys. Med., N.S., 15, (Jan., 1952): 10-14.

Comparative Medical Studies of Chronic Degenerative Diseases as a Veterinary Public Health Activity

Comparative medicine can be defined as the study by comparison and contrast of biological phenomena in health and disease in various animal species, including man. Such studies are not new, forming a part of ancient as well as modern medicine with respect to anatomy, physiology, pharmacology, etc., as well as to communicable and other diseases. Their incorporation as part of veterinary public health activities, however, is a recent development in that they comprise a coordinated and directed application of comparative medical studies to major disease entities of man.

The rationale for comparative medical studies in a veterinary public health context may be summarized as follows:

1) Spontaneous disease processes such as cancer and cardiovascular diseases are biological phenomena common to many species of animals, and it may be safely assumed that these conditions are broadly comparable to those observed in man.

2) Studies of these diseases in domestic animals lend themselves uniquely to epidemiologic types of investigation. Thus environmental factors common to man may be segregated and studied from the standpoint of their possible influence on etiology.

3) A wealth of material is readily obtainable in abattoirs, veterinary clinics, and from the carefully kept records of animal groups (herds or flocks) of similar or contrasting genetic, age, and nutritional backgrounds. The latter factors, amenable to study, may be operative in a particular disease process.

4) The life span of certain animals physiologically resembling man, *i.e.*, dog, telescopes that found in man, reducing the period of time needed for study of age-associated components.

5) Species of animals differ in anatomic and physiologic details, which may result in individual expressions of similar disease processes related to structural or functional variables distinguishing certain species. The existence of these variables, when combined with a detailed understanding of them, may well shed light on the specific factors involved in certain disease conditions.

6) Finally (and obviously), animals can be used for experiments, more easily than man for the investigation of any leads of particular interest.

As mentioned previously, the 2 major problems confronting human medicine with respect to chronic diseases are cardiovascular disease and cancer, and WHO has been examining these fields from the point of view as to how research in animals might be intensified on an international scale for possible light such research may shed on analogous human problems.—*Martin M. Kaplan, V.M.D., chief, Veterinary Public Health, WHO, Geneva, at the WHO/FAO/-CCTA Seminar on Veterinary Public Health, Nairobi, Kenya, Nov. 24-Dec. 3, 1960.*

Histopathologic and Serologic Study of

Subclinical Leptospirosis Among Cattle

H. R. SEIBOLD, V.M.D.
HERBERT KEECH, B.S.
D. L. BOKELMAN, D.V.M.

RENAL LESIONS, characteristic of leptospirosis, were seen at necropsy of cattle used for experimental purposes at the Plum Island Animal Disease Laboratory (PIADL). Histopathologic examination was made of kidneys from 24 randomly selected cattle of which 16 had gross renal lesions. Focal nephritis consistent with leptospirosis was found in 20 of these animals.[1,4,5,7,8,10,11,13] Structures morphologically characteristic of leptospires were found in the renal tubules of 7. These cattle (steers and heifers) were raised in Virginia in a herd that was well supervised with regard to management, breeding practices, and addition of disease-free breeding stock. They were 12 to 15 months old when they arrived at Plum Island. Clinical signs of leptospirosis have not been observed on the farm since 1955, when the herd first was brought under supervision, nor was there any prior history of clinical leptospirosis.

This high incidence of renal leptospiral lesions was viewed with concern since their presence might interfere with the histologic detection and evaluations of lesions associated with the exotic diseases under investigation. For that reason, a study was undertaken which was to consist of a routine histopathologic examination of all cattle received at PIADL during the period of a year. Arrangements also were made to collect a serum sample from each animal just before it was shipped from the farm. The purpose of this article is to report the observations made in the study.

Dr. Seibold is from Plum Island Animal Disease Laboratory, Animal Disease and Parasite Research Division, ARS, USDA, Greenport, Long Island, N.Y. Mr. Keech is from the Bacteriological Investigations, National Animal Disease Laboratory, Animal Disease and Parasite Research Division, ARS, USDA, Beltsville Md. Dr. Bokelman's present address is New York State Veterinary College, Cornell University, Ithaca, N.Y.

Materials and Methods

A total of 338 cattle received from May, 1957, through June, 1958, was examined. A specimen from both kidneys of each animal was taken at necropsy and fixed in 15% aqueous formalin solution. From each specimen, one large tissue block, approximately ¾ by ¾ by ⅛ inch, was processed by the method of Levaditi[6] for spirochetes, embedded in paraffin, and sectioned at 7 μ. A duplicate tissue block from each specimen was embedded in paraffin, sectioned, and stained with hematoxylin and eosin. In cases where the Levaditi-stained sections were found to contain leptospires, additional sections were made from the duplicate tissue block and were stained by the Warthin technique.[6]

The Levaditi-stained sections were scanned microscopically with a 4-mm., 43 x objective and 10 x wide-field oculars. Whenever structures suggestive of leptospires were seen, the examination was then continued with a 1.8-mm., 97 x oil immersion objective. The sections stained with hematoxylin and eosin were scanned with a 16-mm., 10 x objective to locate lesions, which were studied and identified with the 4-mm., 43 x objective. The sections stained by the Warthin technique were examined at all 3 magnifications since these preparations were satisfactory for demonstration of both lesions and leptospires.

The serum samples were collected* just before the cattle were shipped from the

*Supplied by Dr. A. L. Linn, Animal Disease Eradication Division, ARS, USDA.

farm. They were sent to the National Animal Disease Laboratory at Beltsville where the agglutination-lysis tests were made. Three- to 7-day-old cultures of *Leptospira pomona* (Johnson) grown in Stuart's medium[3] containing 7% rabbit serum were used as antigen. Equal volumes (0.2 ml.) of culture adjusted to 35 nephelos density and diluted serum were mixed in Kahn tubes to make final serum dilutions of 1:20, 1:200, 1:2,000, 1:20,000, and 1:200,000. Serum antigen mixtures were incubated at room temperature (25 to 29 C.) for one hour and then read under a darkfield microscope. Readings were made on the basis of degree of clearing. A minimum of 25% clearing was regarded as positive. The time between shipment of the cattle and necropsy was 20 to 190 days.

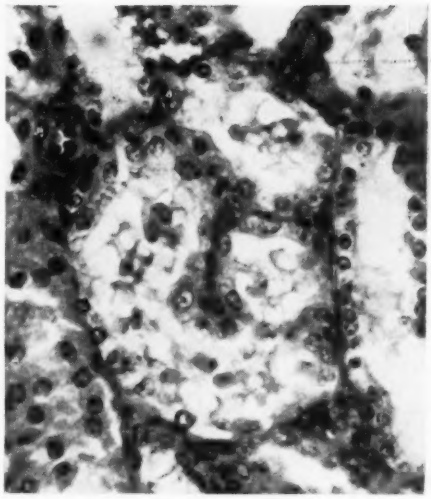


Fig. 1—Acute focal lesion in bovine renal cortex. Necrosis and sloughing of epithelial cells is present in 3 adjacent tubules. H & E stain; x 410.

Results

Description of Lesions.—The lesions were focal and were located mainly in the cortex but sometimes at the corticomedullary junction. In general, they corresponded with published[1,4,5,7,8,10,11,13] descriptions of renal lesions of leptospirosis in cattle. However, the material examined contained different focal lesions in practically every stage of development, thus providing an insight into their development and eventual regression.

The earliest or most acute stage observed consisted of degeneration and necrosis of the epithelium of one or more adjacent tubules in the cortex. Sloughing of the necrotic cells into the lumens of the affected tubules appeared to occur simultaneously with the degeneration and necrosis (Fig. 1). Tubules thus affected contained numerous structures morphologically characteristic of leptospires, thereby establishing the organisms as the cause of the pathologic alterations (Fig. 2). It is presumed that the focal lesions involving 2 or 3 adjacent tubules in reality represented an area of infection in a single convoluted tubule that was twisted upon itself so that, in section, it appeared as 2 or more adjacent tubules. Interstitial cellular infiltration was not seen at this stage.

The next, or subacute, stage in development of the lesions was characterized by regeneration and proliferation of the tubular epithelium. The mild type of infection seen in these cattle did not, in most instances, completely destroy the affected segment of the tubule during the early stages of the lesion. The regenerated epithelial cells had large vesicular nuclei and slightly basophilic cytoplasm. Their histologic appearance gave the impression

Fig. 2—Leptospires in acute focal lesion in renal cortex. Tubule with necrosis and sloughing of epithelial cells contains a clump of leptospires in the lumen. Warthin stain for spirochetes; x 1,090.

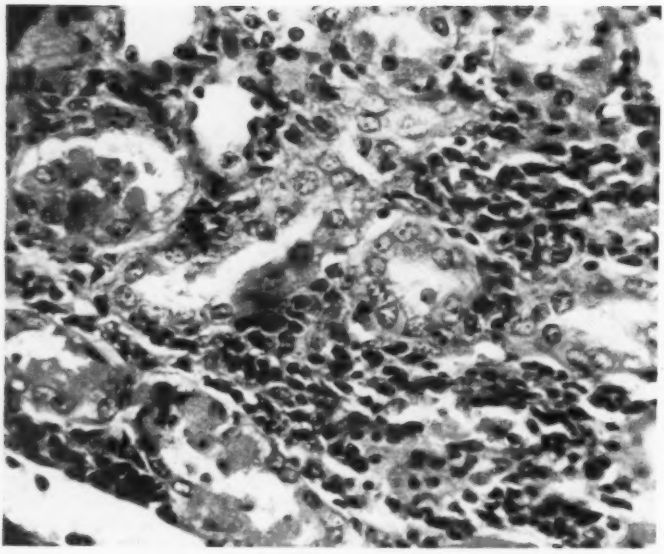


Fig. 3—Subacute focal lesion in renal cortex. Necrotic, desquamated epithelial cells are present in tubules to the left. Regeneration and proliferation of epithelium are visible in tubules at the center and to the right. The interstitial tissue is infiltrated with lymphoid cells. H & E stain; x 410.

that they were undifferentiated lining cells rather than biologically active cells. More cells were produced than were needed to reline the damaged tubules so that the regeneration, in fact, also became proliferation. Slight-to-moderate infiltration of lymphocytes occurred between and among the affected tubules (Fig. 3). Occasional tubules contained masses of desquamated necrotic epithelial cells and leukocytes within the lumens. The marked tubular destruction in cattle from a herd in which abortion resulted from natural infection with *L. pomona*[4] was seen in only 2 cases. In those instances, a few of the lesions were characterized by anatomic obliteration of the tubules and development of giant cells in the area (Fig. 4).

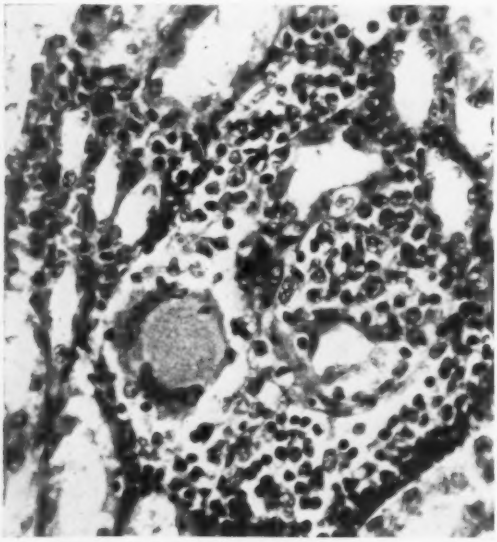


Fig. 4—Severe, subacute focal lesion in renal cortex. Destruction of tubules has occurred, and a large giant cell has developed. There is moderate interstitial infiltration with lymphoid cells. H & E stain; x 410.

As subacute lesions progressed to the chronic stage, tubular atrophy and increase of lymphocytes in the interstitial tissue developed. The affected tubules, with their undifferentiated lining cells, became shrunken to a variable degree, the basement membranes were thickened, and there was partial-to-complete obliteration of the lumens (Fig. 5). Glomeruli in association with chronic lesions were atrophic and had a thickened capsular basement membrane. Usually, there was an appreciable increase in the number of lymphocytes between the tubules as compared with lesions in the subacute stage. However, when chronic lesions finally regressed, the entire pathologic focus became less prominent. The number of lymphocytes diminished and the shrunken, atrophic tubules became so small that careful examination was needed to distin-

guish them from capillaries within a small lymphoid focus.

As would be expected, a sharp distinction could not be drawn between what might be called acute and early subacute lesions nor between late subacute and chronic lesions. Arbitrary classification of the lesions among 276 cattle that had histologic evidence of leptospirosis in the kidneys is given (Table 1). There were 2 animals with acute lesions, 20 with subacute lesions, and 254 with chronic lesions. The last category included many chronic lesions sufficiently advanced to be designated residual.

TABLE 1—Results of Histopathologic Examination of Kidneys from 338 Cattle*

Classification of lesions in kidneys	Presence of leptospires			
	In lesions (active cases)	Only in undamaged tubules at corti-comedullary junction (carrier cases)	None found	Total
Acute	2	0	0	2
Subacute	2	3	15	20
Chronic	0	38	216	254
No lesions (in sections examined)	0	16**	46	62
Total	4	57	277	338

*46 cattle had no lesions or leptospires; 292 cattle had evidence of infection. **Histopathologic study made of only one kidney section; presumably, lesions may have been present elsewhere in kidneys.

Association of Leptospires with Lesions.—Observations on the location of leptospires in relation to the lesions furnished an insight to development of the renal carrier state in animals with subclinical leptospirosis. In the 2 animals with acute lesions, there were numerous leptospires in the damaged tubules (Fig. 2), but an apparent overflow of organisms was also observed in many undamaged tubules throughout the kidneys. The same was true in 2 of the cattle with early subacute lesions (Fig. 6). These animals were classified as having cases of active infection (shedders).

In no instance were leptospires found in direct association with advanced subacute or chronic lesions, although 41 cattle (carriers) with such lesions also had leptospires elsewhere in the kidneys. Two things became apparent from these observations, namely, that the acute lesions were caused by leptospires in the lumens of the affected tubules and that the organisms were destroyed or migrated from the lesions when an appreciable amount of interstitial lymphocytic infiltration had taken place. A

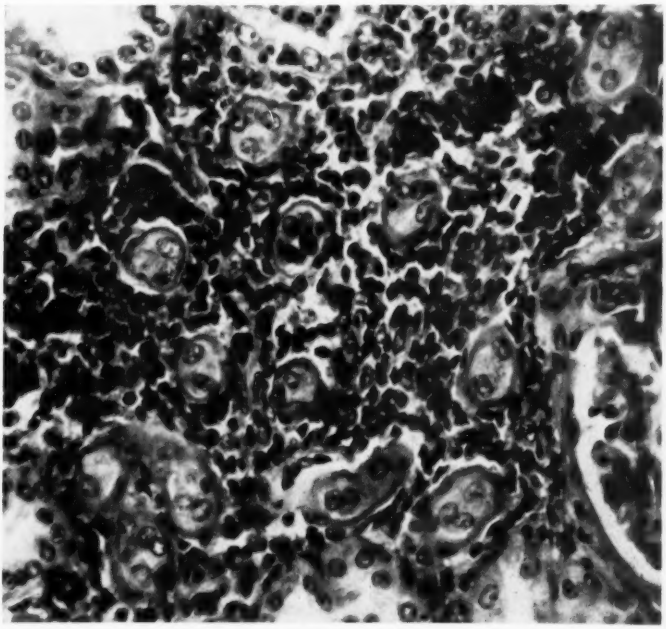


Fig. 5—Chronic focal lesion in renal cortex. Affected tubules have become atrophic, the lumens are obliterated, and the basement membranes markedly thickened. There is thickening of the capsule of Bowman seen at the right. There also is well-marked infiltration of the interstitial tissue with lymphoid cells, H & E stain; x 430.

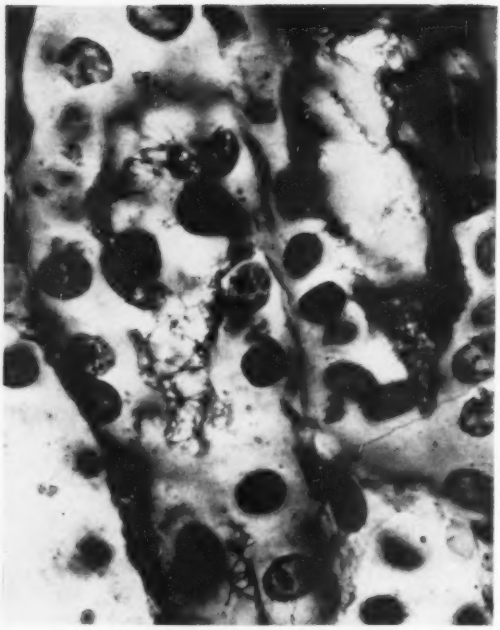


Fig. 6—Leptospires in early subacute focal lesion in renal cortex. Two adjacent tubules with proliferation of the lining epithelium contain leptospires in the lumen. Warthin stain for spirochetes; x 1,090.

possible reason for this will be presented in the discussion.

Leptospires seen in the carrier animals invariably were located within the lumens of certain small, undamaged tubules in the region of the corticomedullary junction (Fig. 7). These tubules had a narrow lumen and were lined with low cuboidal cells. Detailed microscopic study of these tubules was not possible because they could be located individually only in sections stained with silver for demonstration of the organisms. However, it appeared that the lining epithelium was not appreciably damaged by the presence of the organisms. This indicated that a balance between the organisms and the tissues had developed. Often the leptospires in these undamaged tubules were numerous. Among the 338 cattle included in the study, there were 57 that had leptospires within undamaged tubules at the corticomedullary junction. Late subacute or chronic lesions were not seen in 16 of these animals, but this was not considered significant because of the small area (1 microscopic section) of each kidney examined for lesions. A tabulation of the results of the histopathologic study is given (Table 1).

Serologic Results.—Results of the agglutination-lysis test made with *L. pomona* antigen on the serums of these cattle are given (Table 2). Also included in Table 2 are results of *L. pomona* and *Leptospira sejroe* tests on one group of animals shipped approximately 5 months after the last group that was used in the histopathologic study. These test results are presented simply to show that dual infection existed in the herd. It is not known whether additional serotypes may also have been involved.

Preliminary comparison of the histopathologic results with the serologic results obtained using only the *L. pomona* antigen failed to indicate any significant correlation. However, when the data were arranged, as in Table 3, it became evident that approximately the same distribution of microscopic evidence of leptospirosis was found in the serologically negative animals as in those serologically positive. The possible role of a dual infection in developing this situation is considered in the discussion.

Discussion

The lack of correlation between the histopathologic and serologic results might be

TABLE 2—Results of Agglutination-Lysis Tests for Leptospirosis on Cattle Serums

Test date	Experimental status	Antigen	No. tested	No. negative	No. positive	Highest serum dilution of various reactions				
						1:20	1:200	1:2,000	1:20,000	1:200,000
May, 1957-June, 1958	Examined histopathologically	L. pomona	338	191	147	70	14	19	17	27
Nov., 1958*	Not examined histopathologically	L. pomona	32	1	31	1	7	5	17	1
		L. sejroe	32	1	31	3	14	10	4	0

*After the histopathologic study of the 338 cattle was made, these cattle were tested to determine the possible presence of reactors to leptospiral serotypes other than L. pomona.

TABLE 3—Comparative Distribution of Microscopically Positive Cases Among Cattle Serologically Positive or Negative to *Leptospira pomona* Antigen

Microscopic observations on kidneys	Serologically negative for L. pomona	Serologically positive for L. pomona
Leptospires + Lesions +	24 (7%)	21 (6%)
Leptospires + Lesions −	10 (3%)	6 (2%)
Leptospires − Lesions +	124 (36%)	107 (32%)
Leptospires − Lesions −	33 (10%)	13 (4%)

attributed in part to the substantial number (57 or 16%) of the cattle found to be renal carriers of the organism. Since the animals were kept in close quarters at PIADL, it is possible that some became infected between the time serum samples were taken and necropsy (20 to 190 days). Use of paired serum samples in the agglutination-lysis test done at Beltsville was prohibited by quarantine regulations enforced because of the work with exotic diseases at PIADL.

Another and more important factor in the lack of serologic-histopathologic correlation was discovered when the microscopic observations in the serologically positive animals were compared with those in the serologically negative animals. There was an almost identical distribution of microscopically positive cases of all categories in both groups (Table 3). This indicates that infection may have been caused by more than one leptospiral serotype. The positive reactions to *L. sejroe* antigen, obtained in a small group of cattle (Table 2) not included in the histologic study, gives some factual evidence of at least dual infection in the herd. Using a battery of 7 antigens in testing Maryland cattle doubled the number of reactors obtained with *L. pomona* antigen alone.[2] A parallel situation, *i.e.*, that over twice the number of positive cases were detected by histopathologic examination than by serologic testing with *L. pomona* antigen, has been observed (Table 3).

There is an apparent migration of leptospires from the acute renal lesions to certain undamaged tubules at the corticomedullary junction in animals that become renal carriers of the organism. The cortical lesions, indicative of leptospiral infection, result from the presence of leptospires in the cortical tubules and from the damage these organisms inflict upon the epithelial lining. This is attested by the demonstration of large numbers of leptospires within the lesions in the 2 cattle with acute infection and in 2 cattle in the early subacute stage.

It appears, however, that the leptospires are destroyed or disappear from the lesions at an early stage of lesion development. This may be due to release of antibodies from lymphocytes[12] that infiltrate between the infected tubules at the beginning of the subacute stage. At that point, either the affected kidney becomes sterile or some leptospires survive in an environment where a balance can be struck between resistance of the epithelial cells and the pathogenic potential of the organism. Such an environment apparently may exist in portions of certain tubules at the corticomedullary junction. Whether or not an infected animal becomes a carrier, the lesions themselves progress through the late subacute and chronic stage and remain evident as residual lesions for some time thereafter.

There was a high incidence of infection in the herd. Only 10% of cattle in the survey were completely negative for leptospirosis both histologically and serologically. This is not surprising when one con-

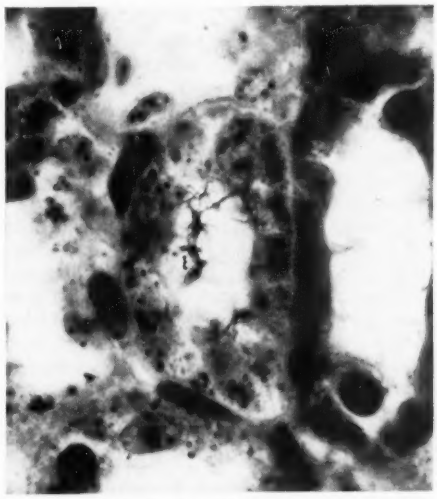


Fig. 7—Leptospires in undamaged renal tubules at corticomedullary junction (carrier case). Warthin stain for spirochetes; x 1,090.

siders that water can become polluted with the organisms and that the organisms can enter the body through undamaged skin or mucous membrane.[9] Subsequent inquiry about conditions on the farm disclosed that cattle and swine were pastured together and that sows had been observed wallowing in cattle ponds on the range. More remarkable is the fact that clinical evidence of the disease had not been reported during the course of the study, despite the high incidence of infection in the herd.

These observations bring into focus problems in the laboratory study of leptospirosis that remain to be solved. Testing of paired serum samples, taken as close to necropsy as possible, would aid in establishing a valid serologic-histologic correlation, providing that a sufficient number of antigens were used to cover the possibility of infection with different serotypes. Even so, there would be gaps in our understanding of what goes on in these bovine kidneys with microscopic indications of infection. One would still have to assume that clumps of leptospires present in undamaged tubules at the corticomedullary junction are a pathogenic serotype and are the same organism that was responsible for subacute or chronic lesions observed in the cortex. The possibility that serotype identification of the organisms in tissue could be made by fluorescent-antibody technique is an intriguing suggestion for future work in this field.

Summary

A histopathologic study of subclinical leptospirosis was made in all cattle (338) received at the Plum Island Animal Disease Laboratory during one year. Microscopic evidence of active or previous infection was found in the kidneys of 292 (86%) of the animals. Focal lesions in the acute, subacute, and chronic stages were observed. Lesions in the acute stage consisted of necrosis of tubular epithelium in the renal cortex; those of the subacute stage were characterized by proliferation of undifferentiated epithelial lining cells and by progressive interstitial lymphocytic infiltration. Chronic lesions were characterized by atrophy of the affected tubules, with thickening of the basement membranes. Eventual regression of the chronic lesions was observed.

Leptospires were found in direct association with acute and early subacute lesions. Along with development of the lymphocytic infiltration, the leptospires disappeared and never were found in the advanced subacute or chronic lesions. In cattle classified as renal carriers, organisms persisted in certain small tubules at the corticomedullary junction only, where they produced no visible histopathologic effect. Four cattle were actively infected with leptospires in the lesions, and 57 carrier cattle had leptospires in undamaged tubules at the corticomedullary junction.

Agglutination-lysis tests for *Leptospira pomona* antibodies were made on single serum samples collected from these cattle ranging from 20 to 190 days before tissues were taken for histopathology. There was lack of correlation between serologic and histopathologic results. The data suggest (1) possible infection after serologic studies were done and (2) infection with other serotypes.

References

[1]Baker, J. A., and Little, R. B.: Leptospirosis in Cattle. J. Exptl. Med., 88, (1948): 295-307.

[2]Byrne, R. J., and Chambers, C. F.: A Serological Survey for Leptospiral Antibodies in Maryland Cattle. J.A.V.M.A., 134, (June 1, 1959): 498-502.

[3]Ellinghausen, H. C., Jr.: Nephelometry and a Nephelo-Culture Flask Used in Measuring Growth of Leptospires. Am. J. Vet. Res., 20, (Nov., 1959): 1072-1076.

[4]Hadlow, W. J., and Stoenner, H. G.: Histopathological Findings in Cows Naturally Infected with *Leptospira pomona*. Am. J. Vet. Res., 16, (Jan., 1955): 45-56.

[5]Jungherr, E.: Bovine Leptospirosis. J.A.V.M.A., 105, (Nov., 1944): 276-281.

[6]Lillie, R D.: Histopathologic Technique and Practical Histochemistry. Blakiston Co., Philadelphia (1954): 401.

[7]Mathews, F. P.: A Contagious Disease of Cattle Associated with Leptospira. Am. J. Vet. Res., 7, (April, 1946): 78-93.

[8]Morse, E. V., and McNutt, S. H.: Experimental Leptospirosis. I. The Course of *Leptospira pomona* Infection in Pregnant Heifers. J.A.V.M.A., 128, (March 1, 1956): 225-229.

[9]Paul, Hugh: The Control of Communicable Diseases. Harvey and Blythe, Ltd., London (1952): 155-157.

[10]Reinhard, K. R.: A Clinical Pathological Study of Experimental Leptospirosis of Calves. Am. J. Vet. Res., 12, (Oct., 1951): 282-291.

[11]Reinhard, K. R., and Hadlow, W. J.: Experimental Bovine Leptospirosis—Pathological, Hematological, Bacteriological and Serological Studies. Proc. Book, AVMA (1954): 203-216.

[12]Robbins, S. L.: Textbook of Pathology. W. B. Saunders Co., Philadelphia (1957): 72-73.

[13]Twiehaus, M. J.: The Pathology of Leptospirosis in Animals. Vet. Med., 52, (1957): 543-545.

Effects of Organic Phosphoramidate (Ruelene) in

Control of Nasal Botfly in Sheep

J. H. MILLER, D.V.M.
H. E. JOHNSON, D.V.M.
A. L. STOUT, D.V.M.

THE NASAL botfly (*Oestrus ovis*), which is parasitic to sheep, is found throughout the world where sheep are raised. In the Columbia Basin, the nasal botfly has become a serious problem to the newly established and growing sheep industry and threatens to become a major obstacle to successful sheep raising.

Life History of *Oestrus ovis*

Live larvae are deposited, a few at a time, in the vicinity of the nostrils of sheep. These move quickly into the nasal passages, move about on the mucous membrane, and feed on the mucus secreted by the tissues. Some of the larvae molt and become 2nd-stage grubs in about 2 weeks. The 2nd instar larvae are about 3/16 inch in length, and are whiter and thicker than those of the 1st instar. These larvae crawl farther back in the nasal cavity and into more remote head cavities such as the frontal sinuses. After molting again, they pass into the 3rd instar. Third-instar larvae are yellowish and become darker as they develop. The larvae cause severe irritation and secretion of large amounts of mucus.

The mature grubs are approximately 1 inch long, ¼ inch thick, and have several dark stripes on the back. Many rows of spines are found across the under surface, and the grub has 2 sharp mouth hooks which are used to attach to the mucous membrane. When fully grown, the grub works its way out of the nares, drops to the ground and burrows into the soil, pupates, and develops into an adult fly in 4 to 6 weeks.

The adult female is 10 to 12 mm. long and is a yellowish brown with transparent wings. The adult fly is most active during the warmest part of the day. The entire life cycle may be completed in about 2 months.

The limited size of the frontal sinuses allows only 2 to 8 grubs to occupy these cavities at a time. Each nasal passage may harbor about 25 of the smaller 1st- and 2nd-instar grubs. The flies overwinter as 1st-instar larvae which become dormant during cold weather and resume their metamorphosis in the spring.

Drs. J. H. Miller and H. E. Johnson are veterinary practitioners in Othello, Wash.; Dr. A. L. Stout is currently on a tour of duty with the U.S. Army Biological Warfare Laboratory, Fort Detrick, Md.

Clinical Signs

Sheep under attack by botflies become anxious, agitated, and restless. They stop grazing and stand huddled together with their noses to the ground or buried in each other's wool. When walking, the sheep maintain this "nose down" position. Stamping and violent shaking of the head are commonly observed.

Sheep in the advanced stages of parasitism are debilitated and often develop severe respiratory distress. Necropsies reveal mucopurulent or suppurative discharge from the nares, sinusitis, and pneumonic lesions.

Two forms of organic phosphoramidate (methyl-4, tert-butyl-2-chlorophenyl methyl ester phosphoramidic acid)* were used in a field study concerning control of the nasal botfly of sheep: (1) 26.4% concentrated liquid containing 285 mg./cc. of the active ingredient and (2) 25.0% wettable powder. A total of 1,149 sheep located on 4 different farms were utilized for this test. Observations were made of the effectiveness of this compound against internal parasites. Fecal egg counts were made before and 5 days after administration of the drug.

Procedure

Flock 1.—Using both organic phosphoramidate preparations, 368 sheep were drenched on the morning of July 8 at the height of the botfly season. The concentrated drench was administered to 200

*Ruelene, Dow Chemical Co., Midland, Mich.

lambs by automatic dose syringe. The dose rate for the concentrate was ¼ oz./40 lb. of body weight (125 mg./kg.). Organic phosphoramidate powder (2.5 lb.) was mixed with water (1 gal.) and administered orally at the rate of 1 oz./40 lb. of live weight (125 mg./kg.). The solution was given to the ewes and the wettable powder to the lambs. Prior to treatment of the sheep in this flock, the number of eggs per gram of feces was determined by routine flotation and McMaster's** method. The owner was asked to report his observations of the flock after medication.

Six aged ewes and 2 lambs were used to test the toxicity of the concentrated solution. The ewes averaged 125 lb. each. The calculated dose of the concentrated solution for these ewes would be 1 cc./5 lb. of body weight to make a dose of 125 mg./kg. of body weight. Normally, these ewes would then be given 20 to 30 cc. of the concentrated solution per 125 lb. of body weight. Eight untreated sheep served as controls. These sheep were held approximately ¼ mile from the main flock which was on pasture. All sheep drenched with the concentrated solution were identified with ear tags (Table 1).

TABLE 1—Reactions in Sheep Given Organic Phosphoramidate

Ear tag No.	Amount given (cc.)	Results
11852	80	No untoward effects.
11853	50	No untoward effects.
11854	25	On necropsy 5 days later, no live larvae.
11855	50	On necropsy 3 days later, no live larvae.
11856	75	No untoward effects.
11857	100	Died in 4 hr.; no live larvae.
11858 (lamb)	24	Slight incoordination; uncomplicated recovery.
11859 (lamb)	24	Slight incoordination; uncomplicated recovery.

Ewe 11857, which was given 100 cc. of the concentrated solution at 11:00 a.m., was reported dead at 3:30 p.m. the same day. A necropsy was performed at 4:30 p.m. The pleural cavity contained no evidence of the drug. Hyperemia of the trachea and secondary pneumonia were present. The liver was hard and friable but no significance was placed on this due to the age and debility of the ewe. At necropsy, the nasal and frontal sinuses of ewe 11857 had congested turbinates and 3, 3rd-stage larvae. Three 1st-stage larvae were recovered from the nasal region; all were dead.

The 2 lambs which became incoordinated were each given 24 cc. of the concentrated solution. These were small lambs weighing about 25 lb. each, and they should have been given a smaller dose due to their size.

On July 10, 2 ewes were euthanatized. In ewe 11855, 3 dead 3rd-stage larvae were recovered from the left frontal sinus. Two live larvae were recovered from a control ewe examined at necropsy at the same time.

Three days following treatment (July 10), the owner reported that all sheep grazed during the day instead of standing bunched as had been observed previous to treatment. Another flock which was not treated and was located on a neighboring farm approximately one mile away was reported by the owner to be restless and bunched in order to avoid botfly strike.

Both flocks were examined on July 11. In the treated flock, few sheep were bothered by flies. The purulent and suppurative nasal discharges had, for the most part, disappeared. The sheep appeared brighter and had more bloom.

A necropsy was performed on ewe 11854 and on a control ewe. No live larvae were found in the treated ewe. However, 3 live 2nd-stage larvae were found in the nasal sinuses of the control ewe. On July 20, the flock was examined again. The general condition was good and there was little or no nasal discharge. The sheep were eating well and appeared to be gaining weight.

Flock 2.—This flock was located approximately one mile away from flock 1. Flock 2 contained 367 sheep and was treated on July 13 beginning at 5:00 a.m. Only the 25% wettable powder was used. Ewes, yearlings, and rams, 210 in number, were treated first. The lambs were drenched immediately after shearing. The flock was carefully examined by the owner and us at various intervals. Discharges from the external nares ceased 3 to 5 days after treatment. The sheep appeared in better condition and were grazing.

On August 2, the owner reported that the sheep were not noticeably bothered by the fly and the treatment had given "excellent results." Last year at this time, the owner had a considerable nasal botfly problem.

**Fecal egg counts were performed by the College of Veterinary Medicine, Washington State University, Pullman.

Flock 3.—A total of 100 ewes and yearlings (band 1) was treated on July 14. Many sheep had discharges. The sheep were bunched with heads held down to avoid the flies. Both wettable powder and concentrated solution were used on this flock.

On July 20, the sheep were examined. The nasal discharge had for the most part disappeared; the sheep were eating well. They were spending more time grazing in the middle of the day than previous to treatment, and there was less bunching and huddling. Little fly activity was observed.

On this day, another flock (band 2), approximately 4 miles away, was examined in order to compare activity. This flock was not used for purposes of evaluating this drug. Fly strike here was apparent and many sheep with nasal discharges were observed. The owner reported heavy fly strike in this flock of about 200 sheep grazing on 80 acres of irrigated pasture. On July 23, the owner of flock 3 reported the treated sheep in band 1 were gaining rapidly and grazing during the day.

An additional 300 head in flock 3 (band 3) were treated with the wettable powder mix at the rate of 125 mg./kg. of body weight or 1 oz./40 lb. of body weight. This was another band on the same farm and was pastured about 1 mile from the other part of the flock. This flock was in good condition but many sheep had mucopurulent or suppurative discharges from the nares. The sheep were bunched, with noses to the ground, and had little desire to graze.

Sheep in band 3 were inspected again on July 29, 6 days after medication. The appearance of the sheep had improved. The nares were generally dry and, in the remainder, only clear mucus was flowing. On the same day, another flock (band 4) not under test was visited. There was evidence of nasal discharge, both mucopurulent and suppurative.

On July 30, a ewe in band 1 of flock 3 was euthanatized. A thorough exploration was made of all sinuses. No larvae were found.

The owner reported little or no fly strike, and most of the sheep had only limited amounts of nasal discharge which was of a mucoid nature.

Flock 4.—On July 23, 14 registered Columbia sheep were drenched with the concentrated solution at the rate of 125 mg./kg. of body weight. Three yearling rams were not treated. The 14 sheep treated consisted of 3 ewes over 2 years old, 3 yearling ewes, 3 ram lambs, 4 ewe lambs, and 1 ram 3 years old. Most sheep had nasal discharges and had difficulty breathing freely. By the morning of July 26, none of the treated sheep had evidence of nasal discharge. All 14 were eating better, and difficult breathing was absent. Of the 3 yearling rams not treated, 2 had nasal discharge and continued to breathe with difficulty.

Conclusion

Two forms of organic phosphoramidate (Ruelene) were used in a field study concerning control of nasal botfly of sheep. A 26.4% concentrated liquid containing 285 mg./cc. of active ingredient, and a 25% wettable powder were the 2 forms of organic phosphoramidate used. Both formulations of the chemical were effective in the treatment of the nasal botfly in sheep in 4 Columbia Basin flocks. Three days after treatment, nasal discharges began disappearing from the nares, and the sheep ceased to bunch. There was clinical recovery, continuous grazing, and lessening of fly strike following treatment. No live larvae were recovered from the sinuses or nasal passages of medicated sheep on which necropsies were performed. Field trials indicate that this drug has low toxicity and can be used against nasal bots with relative safety in sheep.

Since the larvae, under normal conditions, would become adult flies the following spring, the use of this drug on a widespread scale might serve to break the life cycle of the fly and result in its elimination.

Bibliography

Hutyra, Frank A., Marek, Joseph, and Manninger, Rudolph: Special Pathology and Therapeutics of the Diseases of the Domestic Animals. Vol. II. Alexander Eger, Inc., Chicago (1949): 468-470.

Newsom, I. E.: Sheep Diseases. Williams & Wilkins Co., Baltimore (1952): 144.

Peterson, H. O., Jones, E. M., Cobbett, N. G.: Effectiveness of Dow ET-57 (Trolene) Against the Nasal Bot Fly of Sheep, Am. J. Vet. Res., 19, (Jan., 1958): 129-131.

Radeleff, R. D.: New Insecticides, J.A.V.M.A., 137, (June 1, 1960): 529.

Whitlock, J. H.: Diagnosis of Veterinary Parasitisms. Lea & Febiger, Philadelphia, Pa. (1960): 34.

Serologic Evidence of Leptospira pomona

Infections in Meat Inspectors

JOHN E. TOBIE, PH.D.
NORMAN B. MCCULLOUGH, M.D., PH.D.

IN 1944, 2 cases of *Leptospira pomona* infection in cattle were reported in the United States.[8] Following a succession of reports from the various states, it became apparent that the disease was present in all geographic regions of the country. Ten years after the original report, one serologic survey indicated that 11.2% of a group of cattle had had infection with *L. pomona*[3] and, in another study, a serologic incidence in swine of 22.0% was reported.[4] It has been estimated that 2.0 to 4.0% of these livestock were actively infected.[10]

Since 1950, when serologic evidence of human infection was presented,[1] evidence has accumulated which indicates that there is a high correlation between the presence of *L. pomona* antibodies in man and contact with cattle and swine. Individual case reports have described infection in meatpacking employees,[7,11] and serologic evidence of *L. pomona* infection has been shown in groups of veterinarians from Iowa[5] and Missouri.[6] In 1958, studies on 233 packinghouse workers in Omaha, Neb.,[2] revealed that 6.4% of this occupational group had antibodies for *L. pomona*. The importance of this serotype as an infective agent for workers in the particular occupation of meat packing was emphasized.

The purpose of this report is to describe the results obtained in a serologic study of a somewhat different type of packinghouse worker, the federal meat inspector.

Materials and Methods

Source of Serum Samples.—Serum was collected in the course of a brucellosis survey of federal meat inspectors during the winter and fall of 1954. A total of 246 inspectors (33 veterinarians and 213 laymen), all on duty in the New York, Baltimore, and Chicago areas, were examined. In addition to a blood sample, a complete medical history, including questions pertinent to both brucellosis and leptospirosis, work history, and physical examination reports were obtained for each subject.

Over several years, serum from 336 persons was submitted to our laboratory for routine agglutination-lysis tests for *L. pomona, Leptospira icterohaemorrhagiae, Leptospira autumnalis, and Leptospira canicola*. The majority of these persons were patients hospitalized with fever of undertermined origin or with jaundice. They undoubtedly represented a cross section of a great variety of occupations and served as controls in this report.

Agglutination-Lysis Test.—The lepotospires were cultivated in Schuffner's modification of Vervoort's medium.[9] Antigens were prepared from 5- to 8-day-old cultures. So that there would be a minimum of rabbit serum in the culture medium, the cultures were centrifuged in an ultracentrifuge at approximately 21,000 g for 10 minutes. The supernatant fluid was discarded, and the packed organisms were resuspended in a minimal amount of buffered physiologic saline solution, pH 7.0. If the suspension contained particulate material from the culture medium or brood nests, it was centrifuged at low speed, approximately 425 g, for 3 minutes, and the sediment was discarded. An antigen was obtained consisting of individual living leptospires suspended in buffered saline solution, which was free of rabbit serum, particulate material, and brood nests. The antigen was standardized by first diluting the concentrated organisms with buffered saline solution until the suspension gave a reading of approximately 1 on a MacFarland nephelometer. One drop of the suspension, from a pipette calibrated to deliver 40 to 45 drops per milliliter, was then added to and mixed with 0.2 ml. of saline solution in the well of a Boerner micro-test slide. A 5 mm. looplul of material was taken from the well, placed on a slide, and examined with darkfield illumination. The antigen was diluted with buffered saline solution until, by darkfield examination, approximately 3 to 4 layers of leptospires were observed in the center of the loopful of material and one layer toward the edge. The test serum was diluted in Wasserman tubes with buffered saline solution to give final concentrations of 1:30, 1:100, 1:300, 1:1,000, and 1:10,000. The serum dilutions, in 0.2 ml. amounts,

From the Laboratory of Immunology and Laboratory of Bacterial Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda 14, Md.

The authors thank Charles B. Evans for his technical assistance.

were added to the depressions of Boerner microtest slides and, to each, 1 drop of the standardized lepstopsiral antigen was delivered from the calibrated pipette. It was determined that the 1 drop of antigen had a negligible effect on the final serum concentration. The slides were placed on the moistened surface of a Boerner rotating apparatus and covered with a plastic cover to prevent evaporation during the incubation period. The apparatus was rotated (85 r.p.m.) at room temperature for 1½ to 2 hours, and the agglutination reactions read by examining a 5 mm. loopful of material with darkfield illumination. The reactions were graded from 1+ to 4+ with 2+ representing the condition in which approximately one half of the leptospires were agglutinated or lysed. A 2+ or greater reaction was recorded as positive. Agglutination-lysis titers of 1:30 and above were considered to be evidence of residual antibody to previous leptospiral infections. Standard positive and negative serum samples were used as controls to assure that the reactivity of the antigen was the same each time a series of serum samples was tested.

Results

Of the serum samples from 246 federal meat inspectors tested for antibodies to *L. pomona*, 28 (11.3%) gave positive reactions to this serotype (Table 1). In contrast, only 5 (2.0%) were positive to *L. icterohaemorrhagiae*. Four of the 5 reacting positively to *L. icterohaemorrhagiae* also had titers to *L. pomona*. The 3 (1.2%) which were positive to *L. autumnalis* also reacted to *L. pomona*. None of the serum samples reacted to *L. canicola* antigen.

In the control group of 336 patients, the lowest serum dilution tested was 1:100. The serum samples of 330 were negative in all dilutions (1:100, 1:1,000, 1:10,000); 1 (0.3%) had a titer to *L. pomona* (1:100), 4 (1.3%) to *L. icterohaemorrhagiae* (3 at 1:100 and 1 at 1:1,000), and 1 (0.3%) to *L. canicola* (1:100). None reacted to *L. autumnalis*.

Discussion

The detection of antibodies to leptospiral serotypes, and the titers assigned, are dependent to some degree upon the methods of preparing the antigen and of conducting the test. It has been our experience that the use of antigen prepared from leptospiral organisms, which are washed free of culture medium by high speed centrifugation and standardized regarding numbers, tends to increase the sensitivity of the test. Furthermore, we have observed that more clear-cut agglutination reactions are obtained by rotation of the test samples on a rotating apparatus during the incubation period. The increase in sensitivity has not altered the specificity of the test. To test the specificity and also to determine the presence or absence of antibodies to other leptospiral serotypes, the 28 serum samples positive for *L. pomona* were tested, in the same serum dilutions, using antigens for *L. bataviae*, *L. sejroe*, *L. ballum*, *L. hebdomadis*, *L. mitis*, *L. australis B*, and *L grippotyphosa*. None of the serum samples reacted to these antigens in any dilution.

Since federal meat inspectors are intimately exposed to cattle and swine at every step of processing, including handling and examining the glands, viscera, and other tissues, and they perform many different assignments, they would appear to be a good index group for the estimation of degree of exposure of packinghouse workers to infectious diseases occurring in the animals being processed. The presence of antibodies for *L. pomona* in 11.3% of 246 meat inspectors indicates the degree of exposure of this occupational group to this leptospiral serotype. Of the 246 persons tested in the present study, 113 were located in the New York-Baltimore area and 133 in Chicago. Considering those with titers of 1:30 or greater for *L. pomona*, 15 (13.3%) were positive in the New York-Baltimore area and 13 (9.8%) in Chicago. In the entire group, there were 33 veterinarians and 213 lay personnel. Only 2 veterinarians had antibodies for *L. pomona*, whereas 26 lay inspectors had antibodies.

None of the individuals whose serum yielded positive reactions had a history of having had a disease diagnosed as leptospirosis or as aseptic meningitis, although 5 of them had serum titers of 1:300 and one had a titer of 1:1,000 for *L. pomona*. Three had histories of jaundice: one in childhood, one 22 years previously, and one 1 year before examination. There were no histories of inflammatory eye disease other than from one inspector with conjunctivitis 2 weeks before a sample was taken. From the comparatively low antibody levels to *L. pomona*, it is evident that most of the inspectors whose serum reacted positively had had infection with this leptospiral serotype some time in the past.

Taking into consideration the fact that the serum samples from the 336 hospitalized patients making up the control group

TABLE 1—Positive Agglutination-Lysis Reactions of Serums from 246* Meat Inspectors to 4 Leptospiral Serotypes

Serum dilutions	No. positive			
	L. pomona	L. icterohaemorrhagiae	L. autumnalis	L. canicola
1:30	9	4	3	0
1:100	13	0	0	0
1:300	5	1	0	0
1:1,000	1	0	0	0
1:10,000	0	0	0	0
Totals	28	5	3	0

*Of the 246 federal meat inspectors tested for antibodies to the 4 leptospiral serotypes, 217 were negative in all serum dilutions.

were not tested in a 1:30 dilution, and comparing the 2 groups at the 1:100 dilution levels, 19 (7.7%) of the serum samples from meat inspectors reacted positively to *L. pomona*, whereas only 1 (0.3%) of the serum samples from the controls reacted positively. The hospitalized individuals can be considered to be a general population group representing a great variety of occupations. Comparison of the percentages of persons with antibodies to *L. pomona* in meat inspectors (7.7% at 1:100 or >) with a single occupation, to the percentages in the controls (0.3%) with a variety of occupations, indicates that this leptospiral infection is closely related to occupation and contact with cattle and swine. A higher percentage of the controls (1.2%) than of the meat inspectors (0.4%) were positive for *L. icterohaemorrhagiae*.

Summary

A group of 246 federal meat inspectors were examined for serologic evidence of infection with *Leptospira pomona, Leptospira icterohaemorrhagiae, Leptospira autumnalis,* and *Leptospira canicola*. The agglutination-lysis test for leptospirosis revealed that 28 (11.3%) of the 246 meat inspectors had antibodies to *L. pomona*. The demonstration of antibodies to *L. icterohaemorrhagiae* in only 2.0% of the meat inspectors suggests that this occupational group is not as frequently exposed to this serotype as to *L. pomona*. In a control group of 336 hospitalized patients, only 6 had leptospiral serum titers. The higher incidence of *L. pomona* antibodies in meat inspectors, with a single occupation, as compared with hospitalized patients, with a variety of occupations, is strong evidence of occupational exposure to this serotype.

References

[1]Beeson, P. B., and Hankey, D. D.: Benign Aseptic Meningitis as a Manifestation of Leptospiral Infection. Tr. A. Am. Physiol., 63, (1950): 130-135.

[2]Bence, J. J., and Miller, N. G.: A Serologic Survey of Leptospirosis in a Nonselect Group of Hospital Patients and in Packing House Workers. Am. J. Hyg., 68, (1958): 120-125.

[3]Bryan, H. S.: Studies on Leptospirosis in Domestic Animals. III. Incidence of Leptospirosis in Cattle and Swine in Illinois. J.A.V.M.A., 124, (June, 1954): 423-426.

[4]Burnstein, T., and Baker, J. A.: Leptospirosis in Swine caused by *Leptospira pomona*. J. Infect. Dis., 94, (1954): 53-64.

[5]Heeren, R. H., Evans, R. E., and Hendricks, S. L.: *Leptospira pomona* Infection in Man and Animals in Iowa. J. Iowa State Med. Soc., 44, (1954): 285-289.

[6]Higginbotham, H. B., Goldberg, H. S., and Logue, J. T.: Leptospiral Antibodies in Missouri Veterinarians. Vet. Med., 53, (1958): 581-585.

[7]Ivy, J. H., Billings, E. R. and Elliott, T. H.: Human Infection with *Leptospira pomona* in Indiana. J. Indiana State Med. A., 48, (1955): 1095-1098.

[8]Jungherr, E.: Bovine Leptospirosis. J.A.V.M.A., 105, (Nov., 1944): 276-281.

[9]Meyer, K. F., Stewart-Anderson, B., and Eddie, B.: Canine Leptospirosis in the United States. J.A.V.M.A., 95, (Dec., 1939): 710-729.

[10]Morse, E. V.: New Concepts of Leptospirosis in Animals. J.A.V.M.A., 136, (March 15, 1960): 241-246.

[11]Spink, W. W.: Human Leptospirosis Due to *Leptospira pomona*—Report of First Case in Minnesota. Minnesota Med., 35, (1952): 525-528.

Pasteurella Mastitis Resistant to Antibiotics

In a herd of 39 cows in Australia, mastitis due to *Pasteurella* organisms occurred in 1 or more quarters of 7. The disease was characterized by chronic recurrence, production of thin whey, ropy clots, and swollen hot quarters. Treatment with penicillin was ineffective; use of oxytetracycline resulted in apparent clinical recoveries for short periods. Bacteriologically, recoveries were not effected.—*Austral. Vet. J., 36, (Oct., 1959): 409.*

Serologic Evidence of Certain

Virus Infections in Wild Animals

R. L. PARKER, D.V.M.
V. J. CABASSO, SC.D.
D. J. DEAN, D.V.M., M.S.
E. L. CHEATUM, M.S., PH.D.

WILDLIFE RABIES in New York State, first recognized in 1941, remains enzootic in foxes, as in other eastern states, despite a successful vaccination program to control canine rabies.[3] This study, undertaken in an effort to better understand ecologic factors influencing foxes, is a serologic survey of certain wild animals, mainly foxes, to determine the prevalence of complement-fixing antibodies to the viruses of canine distemper, infectious canine hepatitis, eastern and western equine encephalomyelitis, lymphocytic choriomeningitis, and St. Louis encephalitis.

Method of Collection

Blood, collected in 15 counties of upstate New York during 6 weeks beginning in September, 1955, was drawn by cardiac puncture from wild animals by individual trappers employed by the state in its rabies control program. The collecting outfit consisted of a glass bottle with a 2-hole rubber stopper and tubing. One tube connected a 14-gauge, 3-inch needle to the apparatus and the other, used for suction, was fitted with a glass mouthpiece. Each outfit was equipped with a cap to replace the rubber stopper and was sterilized before being supplied to the trappers.

A wire mesh of sufficient size to allow palpation of the heart and insertion of the needle was placed over the trapped animal. Standing on opposite corners of the wire, the trapper was then able to draw the necessary volume of blood, about 200 ml. The stopper was replaced with the cap, and the sex, species, trap number, date, and trapper's initials were recorded on the bottle. The samples were collected daily and delivered to one of the 3 depots where the serums were separated and frozen in 1-oz. vials. At the end of the collection period, the frozen serums were serologically analyzed.*

Complement-Fixation Test

All specimens were tested against 6 antigens: eastern (EEE) and western (WEE) equine encephalitis, St. Louis encephalitis equine encephalomyelitis, St. Louis encephalitis (SLE), lymphocytic choriomeningitis (LCM), canine distemper (CD), and infectious canine hepatitis (ICH). The first 4 antigens** were prepared according to the method of DeBoer and Cox.[4] Canine distemper antigen was prepared from infected ferret spleen, and ICH antigen from infected dog liver following a procedure described by Cabasso *et al.*[1]

The technique employed was essentially the Kolmer-Boerner test[7] with storage

Dr. Parker was with the U.S. Public Health Service, Atlanta, Ga., on loan to the New York State Department of Health, Albany; he is now affiliated with the Midwest Rabies Investigation Station, Wisconsin State Game Farm, Poynette. Dr. Cabasso is with American Cyanamid Co., Pearl River, N.Y.; Dr. Dean, with the Division of Laboratories and Research, New York State Department of Health, Albany; and Dr. Cheatum, with the New York State Conservation Department, Albany.

The authors thank the personnel of the New York State Conservation Department, Bureau of Game, for their cooperation in the collecting and handling of specimens.

*Serologic studies were made by the Viral and Rickettsial Section of the American Cyanamid Co., Pearl River, N.Y.

**These antigens were prepared by Lederle Laboratories Division, American Cyanamid Co., Pearl River, N.Y.

TABLE 1—Results of the Complement-Fixation Testing of Wild Animal Serums Using 6 Virus Antigens

	Species							
	Fox (red & gray)		Raccoon		Opossum		Total	
Antigen	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
CD	31/168*	18.5	2/9*	22.2	0/24*	0.0	33/202*	16.3
ICH	19/168	11.3	1/9	11.1	0/24	0.0	20/202	9.9
EEE	7/168	4.2	1/9	11.1	0/24	0.0	8/202	4.0
WEE	2/168	1.2	0/9	0.0	1/24	4.2	3/202	1.5
SLE	2/168	1.2	1/9	11.1	0/24	0.0	3/202	1.5
LCM	0/168	0.0	0/9	0.0	0/24	0.0	0/202	0.0

*Number of serums reacting in CF test/number of serums tested.
CD = canine distemper; ICH = infectious canine hepatitis; EEE = eastern equine encephalomyelitis; WEE = western equine encephalomyelitis; SLE = St. Louis encephalitis; LCM = lymphocytic choriomeningitis.

overnight in the refrigerator. Two units each of antigen and complement were used uniformly, with the exception of CD antigen to which 1.5 units of complement were added for greater sensitivity. The dilutions were twofold and ranged from 1:4 to 1:512.

Experimental Findings

The results of the complement-fixation tests are summarized (Table 1). Serum from 31 of the 168 foxes was positive for CD; serum from 19 was positive for ICH. Similarly, serum from 2 of 9 raccoons reacted to CD antigen, and one to ICH. Serum from 24 opossums and one skunk was negative.

The serum titers of the 31 foxes and 2 raccoons positive for CD ranged from 1:4 to 1:64, whereas the serum of 19 foxes and one raccoon reacting to ICH had titers from 1:4 to 1:512 (Table 2). Higher titers suggest recent infection, whereas the lower titers are more likely to reflect less recent exposure to the virus. Four foxes and one raccoon had complement-fixing antibodies against both CD and ICH. Based on serologic evidence, CD and ICH are thought to be present in foxes in Chenango, Columbia, Herkimer, Jefferson, Otsego, Schenectady, Schuyler, and Steuben counties; CD, in Cortland and Columbia counties.

All specimens tested were negative for LCM antibodies (Table 3). Low titers (1:4, 1:8) against EEE antigen were observed in the serum of 7 foxes and against both WEE and SLE antigens in the serum of 2 foxes. The serum of one fox reacted to both EEE and WEE antigens, and that of another, to EEE and SLE antigens. The serum of one raccoon reacted to both EEE and SLE antigens; serum of one opossum reacted to WEE antigen.

At the time the serum was collected, a method for comparing the relative densities of fox populations was being tested.[8] Thus, concurrent serum samples and population density index values were obtained in some areas. Density is expressed as the reciprocal of the number of trap-nights per fox. Trap-nights per fox, an expression of the relative effort expended to capture the foxes, represent the number of foxes caught, divided by the product of the number of traps and the number of nights of trapping. For example, 1 trap set for 1 night is 1 trap-night; 10 traps set for 1 night are 10 trap-nights.

Analysis of the serologic data in relation to the population index (Table 4) suggests that, except for area 9, a general correlation exists between high population densities and the presence of CD, complement-fixing antibodies, or both. Although many variables such as availability of food and

TABLE 2—Results of Testing Fox and Raccoon Serums for Complement-Fixing Canine Distemper and Infectious Canine Hepatitis Antibodies

			Positive		Complement-fixation titers							
Antigen	Species	No. tested	(No.)	(%)	1/4	1/8	1/16	1/32	1/64	1/128	1/256	1/512
Canine distemper	Fox	168	31	18.5	21	8	1	....	1	....	....	....
	Raccoon	9	2	22.2	....	....	....	....	2	....	....	....
Infectious canine hepatitis	Fox	168	19	11.3	8	6	2	....	2	....	....	1
	Raccoon	9	1	11.1	....	....	1	....	....	....	....	....

TABLE 3—Serum Titers for Eastern Equine Encephalomyelitis, Western Equine Encephalomyelitis, or St. Louis Encephalitis Antigens in Foxes, Raccoons, and Opossums

Species	Specimen No.	County	EEE	WEE	SLE
Fox	535	Steuben	1:4	—	—
	536	Steuben	1:4	—	1:8
	538	Steuben	1:4	—	—
	549	Schuyler	1:4	—	—
	550	Schuyler	1:4	—	—
	551	Schuyler	1:4	—	—
	639	Delaware	1:4	1:8	—
	734	Schenectady	—	1:4	—
	763	Onondaga	—	—	1:4
Raccoon	537	Steuben	1:4	—	1:4
Opossum	753	Greene	—	1:4	—

cover, hunting, trapping, and disease may affect fox populations, their precise roles are difficult to determine. Rabies is known to reduce fox-population levels[5] and was a definite factor in the variation of the population densities (Table 4). The disease was prevalent during 1955 in areas 6, 7, 8, and 9 with low fox populations and was not reported from areas 1, 2, 4, and 5 with high fox-population index values. Since only one case of fox rabies was reported from area 3 in 1955, the disease apparently was not enzootic and had not materially influenced the population.

Discussion

An effort was made to determine the incidence of exposure to certain virus agents in a wild predatory animal population under natural conditions. The complement-fixation test, despite its limitations, was selected because of its relative simplicity. It was recognized that complement-fixing titers, unlike serum-neutralizing antibodies, may not persist over a long time and that every animal that had been infected with the viruses would not be revealed. Nevertheless, it was thought that the extent of infection would be rather well-indicated, particularly that of recent infections.

The fact that the denser populations yielded larger numbers of CD and ICH complement-fixing positive titers seems indicative of greater opportunity for exposure. A sharp reduction in positive samples was observed between areas 5 and 6, suggesting that a minimum population level may be necessary to allow the spread of these viral agents. The significance of the high level of infection in area 9 is questionable in view of the small number of specimens tested.

Canine distemper and infectious canine hepatitis may infect captive fox populations with disastrous severity.[2] Our study indicates that these agents were not uncommon in the wild populations surveyed, although it is difficult to evaluate their influence on population levels unless comparison is possible with "disease-free" populations. It may be that relatively high fox populations are maintained even though a substantial proportion of the animals come in contact with these viruses.

Inclusion bodies typical of CD are fre-

TABLE 4—Relationship Between Fox Population Indexes and Occurrence of Complement-Fixing Antibodies for Canine Distemper, Infectious Canine Hepatitis, or Both

Area No.	County	Pop. index (1) (TN/fox*)	TN/fox*	Results of complement-fixation tests: CD (No.)	CD (%)	ICH (No.)	ICH (%)	CD, ICH, or both (No.)	CD, ICH, or both (%)
1	Columbia	.122	8.2	2/15**	13.3	4/15**	26.7	6/15**	40.0
2	Steuben	.100	10.0	6/11	54.5	1/11	9.1	7/11	63.6
3	Jefferson	.100	10.0	5/12	41.7	0/12	0.0	5/12	41.7
4	Herkimer	.095	10.5	3/17	17.6	3/17	17.6	6/17	35.2
5	Otsego	.067	15.0	1/18	5.6	4/18	22.2	5/18	27.8
6	Cortland	.047	21.4	0/6	0.0	0/6	0.0	0/6	0.0
7	Otsego	.044	22.8	0/8	0.0	0/8	0.0	0/8	0.0
8	Greene	.027	36.8	0/4	0.0	0/4	0.0	0/4	0.0
9	Chenango	.026	38.0	1/3	33.3	1/3	33.3	2/3	66.7

*TN/Fox = trap-nights per fox. **Number positive/number tested.
CD = canine distemper; ICH = infectious canine hepatitis.

quently observed in the brains of raccoons and foxes submitted for rabies examination, agreeing with the high rate of positive titers (22.2 and 18.5%, respectively) against CD found in these species (Table 1). Evidence of canine distemper occurring naturally in these species in other states has also been reported.[6,10]

Raccoons may be refractory to ICH, although they frequently develop a specific keratitis when the virus is inoculated into the anterior chamber of the eye.[5] Serologic evidence of exposure in this species may reflect subclinical infection.

Justification for testing for LCM antibodies stems from the capability of LCM virus to infect a variety of mammalian hosts including albino mice, house mice, monkeys, dogs, and probably cattle.[9] However, evidence of natural infection was not obtained by the complement-fixation test in this study.

The significance of the low level complement-fixing titers found against EEE, WEE, and SLE (Table 3) cannot be evaluated until more is known about the susceptibility of the animals to these viruses. However, we believe that the results should be considered since, if they were entirely nonspecific, a higher rate of specimens with positive titers, the frequent presence of titers to other antigens against which the specimen was tested, or both, would have been expected. It is noteworthy that 7 of the 11 positive specimens possessed titers against single antigens only.

Conclusions

Serologic evidence of infection with canine distemper and infectious canine hepatitis was observed in foxes and raccoons but not in opossums. In foxes, these viruses are more likely to occur in areas with high fox-population indexes. The critical population-density appears to fall between 15 and 21 trap-nights per fox. More data are required before the critical level can be precisely defined. The significance of the low complement-fixing titers found against EEE, WEE, and SLE antigens is presently unknown.

References

[1]Cabasso, V. J., Johnson, D. W., Stebbins, M. R., and Cox, H. R.: "Atomized" Distemper Vaccine of Avian Origin. I. Experimental Immunization of Ferrets and Mink. Am. J. Vet. Res., 18, (April, 1957): 414-418.

[2]Chaddock, T. T.: Ten-year Autopsy Study of Foxes. Vet. Med., 43, (1948): 13.

[3]Dean, D. J., and Albrecht, R. M.: Rabies. Med. Clin. North America, 43, (1959): 1481-1492.

[4]DeBoer, C. J., and Cox, H. R.: Specific Complement-Fixing Diagnostic Antigens for Neurotropic Viral Disease. J. Immunol., 55, (1947): 193-204.

[5]Green, R. G., Evans, C. A., Yanamura, H. Y.: Susceptibility of the Raccoon to Fox Encephalitis. Proc. Soc. Exptl. Biol. & Med., New York, 53, (1943): 186-187.

[6]Habermann, R. T., Herman, C. M., and Williams, F. P.: Distemper in Raccoons and Foxes Suspected of Having Rabies. J.A.V.M.A., 132, (Jan. 1, 1958): 31-35.

[7]Kolmer, J. A., and Boerner, F.: Approved Laboratory Technic. 3rd ed. D. Appleton Century Co., New York, N.Y. (1941): 616-646.

[8]Parker, R. L., Kelly, J. W., Cheatum, E. L., and Dean, D. J.: Fox Populations in Relation to Rabies. New York Fish and Game J., 4, (1957): 219-228.

[9]Richards, S. H., and Eveleth, D. F.: Preliminary Investigations with a Lymphocytic Choriomeningitis-like Virus Recovered from Cattle. Vet. Med., 52, (1957): 167-168; 174.

[10]Robinson, V. B., Newberne, J. W., and Brooks, D. M.: Distemper in the American Raccoon (*Procyon lotor*). J.A.V.M.A., 131, (Sept. 15, 1957): 276-278.

Canadian View of Distemper Immunization

In a survey of 114 Canadian veterinarians, 72% of the respondents indicated that they were satisfied with their distemper-immunization programs and vaccines. About 25% professed a complete lack of confidence in the ability of any available products to induce passive immunity to distemper. About 85% used booster injections at intervals of approximately 12 months for the 1st 3 to 4 years of the dog's life. About 88% felt that more active public relations were necessary to stimulate public acceptance of distemper-immunization programs.—*Canad. J. Comp. Med. & Vet. Sci. (Dec., 1960): 363.*

Editorial

Veterinary Technologists

At a recent meeting of administrators of veterinary science departments and veterinary colleges, the question of training veterinary technologists was posed. One person doubted that a sufficient number of veterinarians would pay a salary adequate to attract college-trained technologists; another commented that not less than a 4-year course should be considered adequate to train a veterinary technologist; another reported that several veterinary colleges are considering the matter; still another warned against consideration of such training until a workable plan for certification and control had been formulated.

Subjects such as the training of veterinary technologists wax and wane in popularity. A year or so ago, it was popular to speak and write about vertical integration and contractual veterinary services. Group practice had the limelight early in 1961. Perhaps it will give way in the coming months to the training of technologists. At any rate, the purpose of this editorial is to stimulate some realistic thinking about veterinary technologists.

Is There a Demand?

A survey conducted among veterinarians in New York State revealed that 99 of 222 respondents would employ a trained veterinary technician. Of the 89 who indicated a monthly salary, 18 said they would pay $250 or more; 68 said they would pay $300 or more; 3 said they would pay $400 or more.

In the city of Chicago, where 32 practitioners (most of them in small animal medicine) were interviewed by phone, 29 said they would definitely consider employing a person who had completed a 2-year college course in veterinary technology. Among the 24 who were willing to estimate a monthly salary, the lowest estimate was $250, the highest was $500, and the average was $349. When asked if there was reason to fear that veterinary technologists would subsequently terminate their employment with a veterinarian and encroach in some way on veterinary practice, 21 said no, 8 said yes, and 4 said perhaps.

There seems to be a need, and at least some opportunities, for properly qualified veterinary technologists. It is nice to contemplate that in the not-too-distant future, the veterinarian may be able to apply his knowledge and skills to purely professional practice activities while his technical assistants perform a large share of the nonprofessional tasks. But would veterinary practitioners pay salaries sufficient to make these people willing to remain under direct veterinary supervision? Would they hire the number that the colleges could produce in just a few years?

Some Viewpoints

One layman closely associated with organized veterinary medicine asserts that farmers in his state are paying too much for veterinary service because they are paying veterinarians to perform tasks which should be done by laymen. He envisions the veterinarian of tomorrow as a

supervisor who makes the diagnosis and administers only treatment that requires a high degree of skill. (Would this create the situation reported to exist in some Asiatic countries where, it is said, the most serious fault of veterinarians is that they insist on being supervisors and are reluctant to participate in actual work?) This same person feels that veterinary technologists should be trained and made use of, and that apprehensions regarding encroachment on practice are unfounded. He feels that they will "somehow" be controlled.

An officer of a state association approves the training of veterinary technologists in his state because he believes the veterinary practice act in his state will assure against encroachment. However, he recognizes that the problem will be a national one when these technologists move to other states. He foresees that some veterinarians would employ technologists rather than graduate assistants. Pointing out that lay assistants to veterinarians in his state are even now doing many things they are not legally qualified to do, he suggests that "there should be some kind of control over technologists."

The Feldshers

Consideration of the veterinary technologist question would not be complete without mention of a similar system in another country. Members of an official U.S. delegation of veterinarians to Russia in July and August, 1958, commented briefly but not unfavorably on the "feldsher" system. Their official report reads: "Veterinary assistants with specialized training are designated 'feldshers.' They receive approximately 3 years of practical training in schools of veterinary medicine. There are approximately 49,000 feldshers in the entire country. . . ." However, a member of the delegation has said, "In my opinion, utilization of the feldsher system in our free country would not be satisfactory . . . because of the tendency of trained veterinary medical assistants to assume enterprises independent of veterinarians and independent of their intended status. While I advocate fully that trained veterinarians should not utilize their time in the performance of nonprofessional tasks, I believe that development in America of a system similar to the feldshers should be preceded by public sentiment and possibly legislation for proper control of persons who are trained to function as assistants."

A visitor from an iron curtain country reported to the AVMA staff that to his personal knowledge the feldsher system in both Russia and Poland is quite unsatisfactory because the feldshers are dissatisfied with a secondary role. In Russia, where they outnumber the 42,000 veterinarians, there is reason to fear that the latter may lose control over their own profession.

The Denturists

For an example of what has happened in our country when there is inadequate control of the assistants to a professional group, let us turn our attention to the dental profession. Dental technologists and denturists perform illicit dental services throughout the country. True, dentists are dependent on technical assistance; they could not serve the present dental needs of our people without it. Nevertheless, the encroachment of literally hundreds of dental quacks is one of the most serious problems facing organized dentistry. In an American Dental Association release in 1960, it was stated that

> . . . bootleg dentistry is costing its victims millions of dollars a year. . . . Dental racketeers are using every available means to advertise their 'buy-direct-and-save' bargains—shop windows, direct mail, newspapers, magazine and telephone directory ads, handbills, and personal solicitation in public places such as parks, beaches, bus depots, and taverns. Their common trait is the ruthless pursuit of the quick and easy dollar. Their distinguishing mark is the manner in which they conduct their illegal business.
>
> Some bootleggers are employed by day as technicians in a law-abiding dental laboratory. At night, or on weekends, they make dental appliances for friends, neighbors, and customers they pick up through casual conversation or references. They are the bushwhackers in the dental field.
>
> Others operate undercover places of business—a kitchen, a garage, a dingy shop, a backroom in a barbershop.
>
> Finally, there is the status-conscious bootlegger who impresses his victims with one or two dental chairs in a room adjoining his laboratory facilities. He may go through the motions of a dental examination, and may not hesitate to do extractions. He and his assistants are always dressed in professional white. The public may not be able to distinguish his appearance from that of the licensed dentist.

By contrast, law-abiding dental laboratory technicians, who make up the vast majority, fashion or repair dentures only on instructions from the dentist. Except for direct patient contact, they work similar to the manner in which the druggist follows the written instructions of a physician. Trained in the mechanical skills of making and repairing dental appliances, the conscientious dental laboratory technician works harmoniously with the licensed dentist—to the benefit of the public's health.

As recently as July, 1960, legislation under consideration in the state of Washington would have made it permissible for denturists to serve the public directly. If such legislation is successfully promoted in one state, undoubtedly similar legislation will be initiated throughout the country.

Plans Under Way

Agricultural college officials in one state have already completed the initial planning for a 2-year course in veterinary technology. These sincere people, anxious to provide new fields of work for students with agricultural backgrounds and limited prospects of returning to the farm, are not interested in preparing the student for a career as a lay veterinary assistant only. From their point of view, it is imperative that the students' training be broad enough so that he can assist a practicing veterinarian *or* work in feed companies, drug firms, commercial laboratories, humane associations, artificial insemination groups, milking machine sales, mastitis control, food inspection, livestock inspection, farm management, or in laboratory animal care. The graduates of their 2-year course would receive a diploma and probably would be called "animal technologists."

The dean of one veterinary college firmly believes that the training of veterinary technologists under a 2-year program and at agricultural colleges would be shortsighted and unfortunate. He believes that the training of veterinary technologists should be equal to that of medical technologists and that responsibility for the training could not be properly assumed by agriculture or any field other than one of the medical sciences. This dean, in a report to his state commission on higher education, has indicated the need for a 4-year, B.S. degree curriculum for medical technologists as a basis for extending and re-enforcing the time and efficiency of his college's doubled capacity for educating veterinarians by 1975.

Time to Be Realistic

There will be some who will loudly proclaim that the training of veterinary technologists is the progressive thing to do—that it should be accomplished as soon as possible. By the time veterinary technologists become a serious problem to the profession, the "progressives," unfortunately, will have moved on to greener fields and will be promoting other progressive schemes. Those who take the more conservative and less popular position will be labeled nonprogresesive. If it happens that a monster has been produced, however, it is the "conservatives" who will be picking up the pieces, fighting the brush fires, and organizing legislative committees to amend state practice acts or to combat unfavorable legislation.

What the AVMA position is or will be cannot be stated yet. Our purpose here is to advise all who have public welfare and animal health at heart to be cautious about committing themselves to a course that may seem progressive and advisable now but may prove to be extremely troublesome later.

The greatest need for technologists at the present seems to be in small animal practices. But is it possible that preoccupation with the needs of practitioners will cause some of us to overlook the increasing demand for properly trained technologists in the expanding teaching and research programs, in industry, and in other organizations?

Consider the veterinary practice act in your state. Is it adequately designed to control the activities of technologists who would be working eventually in virtually every type of activity now served by graduate veterinarians? Did it require years of dedication and hard wrok to get your practice act in its present form? If so, is it likely that it can be readily changed to meet new problems? Consider, too, that even in those states with "good" practice acts, the state officials rarely have funds with which to investigate alleged violations of the practice act.

Have the proponents of veterinary technologist training in your state made the honest error of overlooking some of the

dangers because they are in positions relatively safe from potential encroachment? Can you afford to be as naive as one official who urges that this progressive step be taken but feels that some agency such as the AVMA should assume responsibility for certification and control? The creation and control of veterinary technologists would be a function of the people within a state. The AVMA would be no more able to control technologists than it can go into a state and change a veterinary practice act.

A program of veterinary technology has much to recommend it. The advantages are obvious. The disadvantages are real and important, even if they may not be so obvious, and an aura of progressiveness should not be permitted to completely obscure them.

Physical Therapy for Dogs

The value of physical therapy is widely recognized by physicians, but for practical reasons has been disregarded by most veterinarians. Physical therapy requires continuous and time consuming effort; it is expensive therapy. However, the advent of more veterinary hospitals with modern facilities has made the use of physical therapy practicable, particularly in the treatment of canine patients with paresis and paraplegia resulting from intervertebral disk lesions.

Physical therapy methods—thermotherapy (infrared irradiation, moist heat fomentations, and warm water baths), massage, exercise and stretching, electrical stimulation, and ultrasonic therapy—are rational and successful, but for the most part unproved in veterinary practice. One evaluation of physical therapy methods, as they apply to paretic and paraplegic dogs, is documented elsewhere in this issue. The results should be highly illuminating to those now employing or contemplating physical therapy in veterinary practice.

from the Research Journal

Siliceous Calculi in Kidneys

There is histologic evidence that microscopic silica deposits form in the kidney tubules of guinea pigs given relatively large quantities of soluble silica. The deposits were formed when oral doses of tetraethyl orthosilicate or intraperitoneal doses of freshly prepared soluble silica were given. Ten-micron sections of these deposits were shown to resist treatment with strong hydrochloric acid but were readily dissolved by hydrofluoric acid. A similar process may play a role in the development of silica calculi in cattle.—[*W. R. Settle and F. Sauer: Demonstrations of Siliceous Deposits in the Kidneys of the Guinea Pig. Am. J. Vet. Res., 21, (July, 1960): 709-711.*]

Blood Response After Hypervitaminosis D

The peripheral blood picture of 30 male *Macaca mulatta* monkeys was studied 12 to 16 months following acute vitamin D intoxication. Hematologic values were compared with the normal ranges published in the literature and with normal values taken in monkeys prior to the hypervitaminosis D. An analysis of variance was performed to assess the effect of frequent blood aspiration on peripheral blood values.

A comparison with similar results taken in monkeys before the episode revealed that the responses to experimental hemorrhage were equivalent. Clinically, the animals appeared to be in excellent health. By these 2 criteria, the survivors of acute Vitamin D poisoning were essntially normal hematologically.—[*Response of Hemoglobin and Cellular Element of Blood After Hypervitaminosis D in Monkeys. Am. J. Vet. Res., 21, (Nov., 1960): 1128-1131.*]

Portal and Mesenteric Vein Catheters

A special technique was used for the establishment of both portal and mesenteric vein catheters in calves. The discussion included preanesthesia medication and anesthesia, care of catheters, anticoagulant drugs used for prevention of intravascular clotting, and a possible sequela, that of a shifting of the catheter after its initial placement. Portal blood samples were collected successfully up to 73 days after catheterization in 15 unanesthetized calves. There were no untoward effects due to the catheters and the calves were apparently normal during the period of experimentation. Mesenteric vein catheters were used for injecting dye in flow determinations. [*G. H. Conner and G. F. Fries: Studies of Bovine Portal Blood. I. Establishment and Maintenance of Portal and Mesenteric Vein Catheters. Am. J. Vet. Res., 21, (Nov., 1960): 1028-1032.*]

Bayer 21/199 as an Anthelmintic

Bayer 21/199 was tested for anthelmintic activity and toxicity in lambs and for toxicity in calves. Haemonchus spp. and Cooperia spp. were particularly susceptible at the dosage levels used (3.0 to 12.5 mg./kg.). Signs of intoxication were observed in 1 lamb given 12.5 mg./kg. and in all calves given 12.5 to 50 mg./kg. Blood cholinesterase activity was markedly depressed at all dosage rates.—[*T. J. Galvin, R. D. Turk and R. R. Bell: Anthelmintics for Ruminants. I. Studies on the Toxicity and Efficacy of Bayer 21/199 as an Anthelmintic. Am. J. Vet. Res., 21, (Nov., 1960): 1054-1057.*]

Effects of Time and Temperature on Swine Serum

Swine serum samples were exposed to various combinations of time and temperature. Electrophoretic analyses indicated a progressive increase of albumin-*gamma* globulin complex with an increase of either temperature or time of exposure.—[*J. Mathews: Electrophoretic Study of Time-Temperature Effect on Swine Serum. Am. J. Vet. Res., 21, (Nov., 1960): 1124-1125.*]

Electron Microscopy of *Anaplasma marginale*

Erythrocytes of the deer with acute anaplasmosis have been studied in sections and shadow-cast preparations. The organism of *Anaplasma marginale* consisted of 1 to 8 initial bodies embedded in an apparently homogeneous matrix. The latter was demarcated from the erythrocyte by a well-defined membrane approximately 10 μ in thickness. The initial body was round or oval, 300 to 400 μ in diameter, and enclosed in a double membrane. The internal structure of this body consisted of one central and a few peripheral dense aggregates of finely granular material embedded in an electron-lucid substance for which the term "plasma" is proposed. Preliminary observations suggest that the initial body may reproduce by binary fission and that the marginal and initial bodies occur in blood platelets of infected animals.—[*M. Ristic and A. M. Watrach: Studies in Anaplasmosis. II. Electron Microscopy of Anaplasma marginale in Deer. Am. J. Vet. Res., 22, (Jan., 1961): 109-116.*]

New Books

Reproduction in the Dog

This book is a happy addition to the veterinary literature by making available to the practitioner information concerning reproduction, artificial insemination, and infertility. The author, with the assistance of 5 colleagues as contributors, has written the book in simple straight-forward language so that it is of interest not only to the veterinarian but the dog breeder as well. As stated in the preface, the book is designed and intended to be a practical volume in which Mr. Harrop has drawn on his long experience in this field to set down information not already recorded in our literature. This volume also brings together, under one cover, many of the scattered bits of information concerning breeding problems in the dog and presents it in an orderly fashion. Each chapter is well documented for those who wish to pursue the subject in greater detail.

There are 10 chapters in all dealing with anatomy, histology, physiology of reproduction, mating, pregnancy, normal parturition, dystocia and surgical procedures, pediatrics, nutrition, and infertility. The chapter on natural service and artificial insemination is well covered, reflecting the author's extended experience in this specialized field. Much of the early part of the book is devoted to anatomy and physiology of the reproductive organs and serves as an excellent background for those experienced in the field of reproduction as well as for the novice. The chapter on infertility is brief and lacks detailed information on many of the problems in this field. No doubt the author will enlarge upon this section of the book in subsequent editions.

The author has made a valuable contribution to our veterinary literature in a field that has received too little attention. Any veterinarian practicing in the field of small animal medicine and surgery should have this book in his library.—[*Reproduction in the Dog. By A. E. Harrop. 204 pages; 75 illustrations. Williams & Wilkins Company, Baltimore, Md. 1960. Price $7.00.*]—Ellis P. Leonard.

NEWS

The American Association of Equine Practitioners Meets

A total of 250 veterinarians registered for the meeting of the American Association of Equine Practitioners at Phoenix, Ariz., Dec. 12-14, 1960. At the business session of the association, 82 applicants were accepted for membership.

Also at the business meeting the association voted to increase annual dues to $25 effective for the year 1962.

Officers of the association are: Drs. M. B. Teigland (ISU '45), Opa Locka, Fla., president; W. O. Reed (OSU '44), Elmont, N.Y., president-elect; Frank J. Milne (EDN '41), Guelph, Ont., secretary-treasurer; Gen. Wayne O. Kester (KSU '31), Denver, Colo., chairman of the board; and M. L. Scott (OSU '19), Akron, Ohio, executive secretary.

A special committee, after studying the role of veterinarians at horse shows, recommended that:

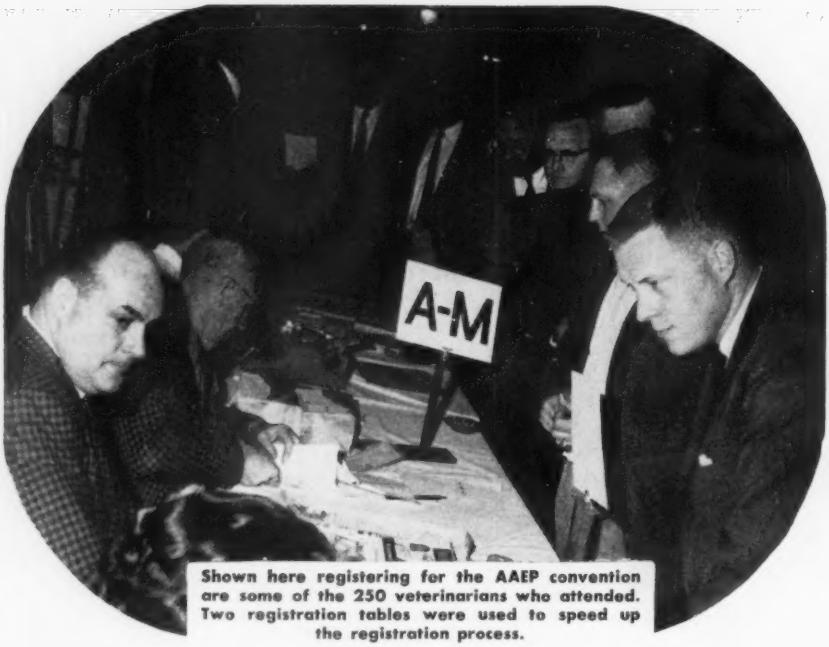
- Veterinarians should not be employees of show associations but should be consultants to the judges, who may accept or reject their advice. An honorarium of $100 per day for veterinarian-consultants was recommended.
- Veterinarians should be on hand at all times to render services at the request of the judges or stewards.
- Veterinarians should determine the physical condition of horses in question.
- Veterinarians should extend services to visiting teams where international activities are being held.
- If judges reject the opinion of veterinarians in the show ring, veterinarians should file, in the horse show offices, special forms stating the facts.
- The AAEP should consider compilation of a list of capable veterinarians willing to serve at horse shows.

During the final session, the association, in considering the medication of race horses, reached unanimous agreement to support:

- Prohibition of the use of a stimulant, depressant, or local anesthetic in a manner that might affect the racing performance of a horse.
- Full use of modern therapeutic measures for the improvement and protection of the health of the horse.
- Regulation, and reporting to proper officials, of the administration of any medication which by its nature might influence the racing performance of a horse for a specific race.

The AAEP Executive Committee Recommended that the annual meeting be held in Chicago in 1962, and somewhere on the East Coast in 1963. The annual meeting in 1961 will be held in Fort Worth, Texas, December 4-6.

The following pictures and quotes were taken from the scientific sessions at the AAEP meeting.



Shown here registering for the AAEP convention are some of the 250 veterinarians who attended. Two registration tables were used to speed up the registration process.

Dr. E. R. Walker

"Equalizers for Equine Practice"

For the treatment of extensive lacerations and neglected wounds such as those that occur on the rump and on the pectoral muscles of ranch horses that are not well-behaved, we use a wound dressing that we make from scarlet oil, zinc oxide, fish oil, DDT, and raw linseed oil. We apply this every 3rd day with good results. . . . For flushing the nasolacrimal duct of horses, we use a canine catheter. It is pliable and can be inserted into the duct without tearing the orifice. It permits the operator considerable freedom of movement, which is important when the horse is unruly.

Dr. Frank J. Milne

"Subcutaneously Induced Counterirritations"

According to clinical and microscopic examination of tissues after firing and blistering, it was apparent that blistering is a superficial type of counter-irritant while perforating firing is more likely to get down to the seat of the trouble. However, due to heat dispersal of the tissues, perforating firing, as commonly carried out in North America, rarely achieves its expected objective.

In certain areas, the injection of various dilutions of Lugol's iodine gave a much greater reaction within the deeper tissues than is obtained from any of the currently employed methods of counterirritation.

Panel on Equine Radiology

Dr. Myron Thom

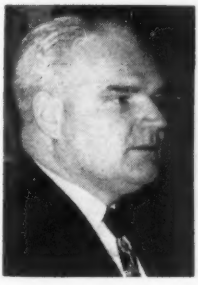
Normal circulation results in normal calcification. Increased circulation causes decalcification, and decreased circulation causes an increase in calcification. The reason we get the calcified conditions throughout the tendon attachments and in the bursas following trauma is that we have areas of low metabolism and, when we get decreased circulation, we get increased calcification. Anything that will increase hyperemia will draw more blood to the part and will help to absorb the calcium causing the trouble. One effect of irradiation is to cause increased circulation.

Dr. L. E. Johnson

"Cure" is too often an infrequent accomplishment regardless of methods used, yet honest appraisal by outstanding practitioners seems to indicate that radiation is worthwhile in selected cases of lameness. . . . With the advent of practices in which radiation therapy, noninflammatory agents, analgesics, etc., are being used, a new perspective of treatment is required by all of us.

. . . Polygenic inheritance, conformation, training irregularities, trainer-prescribed medicaments, and track conditions, all indicate that lameness should be regarded as being of multifactorial origin and thus not always amenable to just one or two methods of treatment. . . . Premature and inconclusive evidence from work just under way indicates, for example, that more often than not anti-inflammatory agents are harmful; in addition, their effects cause a false sense of security on the part of the owner and trainer. . . . Yes, lameness in horses is truly a "thinking man's" problem.

Dr. D. L. Proctor



The treatment of inflammation with radioactive cobalt can be dramatic. An ankle that has been "hot" for perhaps 90 days will become "cold" within 48 hours. Suddenly, instead of a horse chronically lame due to acute inflammation, there is a sound horse, and the chances are that he will stay sound. He can be galloped or worked slowly for an indefinite period. If you keep him away from the race track, you will have a sound horse from then on. But you cannot expect radiation therapy to keep a horse sound and keep him in training at the same time.

Dr. C. F. Reid

After actively exposing horses to known amounts of ionizing radiation, and studying them for several months, we came to the conclusion that if the exposure did not exceed 1,000 r in one single dose, visible changes did not occur in the skin of these animals. If they were treated with between 1,000 r and 2,000 r, slight fibrous scars developed and growth of some white hairs occurred. When the exposure exceeded 2,000 r, the probability of radiation necrosis became increasingly great. The source of radiation that produced these changes was a 280-kv. x-ray machine and all were single nonfractionated doses.

Dr. J. B. Chassells

Some of the best results in radiation treatment of horses involves those cases where the fetlock is swollen and grossly it appears that osselets have formed; however, after radiographs have been taken, no bone damage is found. The correct diagnosis is really fibrositis. Radiation in such instances will result in permanent relief.

Dr. J. E. Burch

"Fluid Therapy in the Horse"

The physiologic ramifications of fluid and electrolyte imbalance are complex. The exact levels of electrolytes in horses are not completely understood. For example, we need to know more about total volume of blood, about the extracellular fluid volume, about the intracellular fluid volume, and about the normal pH of blood in health and in different diseases. We need to know more about CO_2 levels in healthy and diseased horses and should be able to assess the individual horse so that we can treat him more accurately. The proper treatment with fluids rests upon an accurate diagnosis of the patient's particular disease or metabolic defect.

Dr. C. H. Reid

"Practice in the Hollywood Film Industry"

A "motion picture" practice creates its own peculiar situations which call for ingenuity and resourcefulness. . . . In addition to domestic animals, there are many wild and exotic animals used in picture-making. Often these animals are required to do what could be termed "unnatural." For example, there are "falling" horses. None of these animals are exposed to unnecessary hazards; on the contrary, great care is exercised in selecting the terrain and "shooting" conditions. Also, the nature and capabilities of the animal are studied. All of these factors are evaluated before the actual "shot" is made, and precautions are taken to prevent injury or damage to the animal and equipment.

Dr. E. E. Leasure

"Future of AAEP Explored"

Equine practice is undoubtedly the oldest specialty in our profession. We have leaned heavily upon this specialty as a foundation upon which to build. Yet, the AAEP is perhaps the youngest among a rather sizeable list of specialty groups within the veterinary profession. As it grows you will experience many problems, among these being constitution and bylaw changes pertaining to qualification of applicants for membership. Will all who apply for membership be accepted or will certifying standards be set up? If so, what will these be, and how will they be determined and adjudicated? And what about continuing education for the equine practitioner? I'm glad to know that your association is concerned about the professional proficiency of its membership and is considering the means whereby appropriate certifying standards may be determined.

Equine practitioners listen attentively as Dr. J. E. Burch discusses "Fluid Therapy in the Horse."

"Diarrhea Problems of Houses"

Dr. William L. Anderson

Dr. J. M. Miller

As for long-range prevention of the diarrhea syndrome, I follow a sound worming program on the theory that parasites may cause irritation and that viruses or bacteria may then infect as opportunists, once enteritis has begun. I also use mixed bacterins and feel it is important to sterilize clothing and footwear; to use disposable syringes whenever possible; and to autoclave all instruments. Newly purchased horses should be isolated from the remainder of the horses on the ranch for 3 to 4 weeks if possible. In other words, I recommend sound management practices.

In most cases of the acute intestinal form of viral arteritis seen at Ruidoso Downs in 1959, a typical acute influenza-like respiratory infection had occurred within 7 to 15 days previously. Symptomatic treatment was usually good. Horses that died were those that had been returned to training within 7 to 10 days. In a large majority of the fatal cases, the horses had been worked the day of their death. Deaths were more frequent in 2-year-olds than in older horses. An abrupt decrease in the attack rate of the acute gastroenteritis occurred when a minimum of 3 weeks' rest was enforced after the appearance of initial respiratory signs. Severe diarrhea with sudden onset, cramping, toxemia, depression, and cyanosis are the most marked signs of viral arteritis.

Lt. Col. Willys E. Lord

"Thoroughbred Practice in the Tropics"

Nonsweating is a serious equine problem in the tropics, and I encountered this condition in Panama and India. If these horses are raced, their performance is substandard and they may drop dead on the track. We tried many things but the only successful treatment was to put the horse in air-conditioned stalls. After having failed to sweat for perhaps 6 months at a time, they will then start sweating in 4 days. Of course, moving them to a cold climate produces the same result.

Dr. Raymond Zemjanis

"Pregnancy Diagnosis in the Mare"

In response to the question pertaining to pregnancy diagnosis by detection of PMS in the serum of mares, I would suggest the mouse test. Thirty to 40 ml. of blood is allowed to coagulate at refrigerator temperature and serum is recovered; 0.25 ml. of serum is injected twice daily for 2 days into 4 or 5 mice approximately 3½ weeks old. The results are read 24 to 36 hours after the last injection, by postmortem examination of the genital tract. Small, underdeveloped ovaries and uterus indicate absence of PMS in the blood of the animal tested. The test is positive if the uterus is enlarged and turgid and the ovaries contain several follicles. The test is reported to be reliable from the 50th to the 100th day of the gestation period.

Dr. Donald Miller

"African Horse-Sickness"

There are 4 clinical forms of African horse-sickness: febrile, pulmonary, cardiac, and mixed. The pulmonary form is the most common and is characterized by signs of acute pulmonary edema and hydrothorax. There may be a liquid or frothy yellowish nasal discharge, especially after paroxysms of coughing. In the cardiac form there may be extensive swelling of the head and neck regions. There is a yellowish gelatinous infiltration of the subcutaneous, subserous, and intramuscular tissues of the head, neck, and thorax. Hydropericardium is an almost constant lesion and there are diffuse hemorrhagic lesions throughout the cardiac tissue.

"Liver Function Tests in the Horse"

The presence of fibrosis or necrosis of the equine liver can be diagnosed by a few laboratory tests. Hepatic necrosis produces elevations in certain serum enzyme activities (glutamic-oxaloacetic transaminase and isocitric dehydrogenase), which are associated with elevated levels of bilirubin in the serum. Bromsulphalein (BSP) clearance from the serum will be delayed in hepatic damage if hepatic fibrosis, necrosis, or a lowered portal blood flow is present. In horses, a delayed BSP clearance, but accompanied by normal serum enzyme activities, suggests hepatic fibrosis without necrosis. The serum van den Bergh test is of little use in distinguishing the cause of icterus in the horse since free bilirubin (indirect reacting) is elevated in hepatic disease. This finding is not observed in other domestic species. Signs of central nervous system involvement in the horse due to hepatic insufficiency can easily be distinguished from primary brain lesions when liver function tests are performed.

Dr. C. E. Cornelius

"Respiratory Problems of the Horse — Their Diagnosis and Treatment"

Dr. E. A. Churchill

It is my estimation that more than 50% of all cases of inspiratory dyspnea are caused by chronic pharyngitis. . . . Inspiratory dyspnea is not a disease; it is a clinical sign of many interrelated respiratory conditions in the horse. . . . Repeated examinations may be necessary to determine the exact cause of dyspnea. . . . I think the laryngoscopic examination is a necessity because it gives you much information not obtainable in any other fashion.

Dr. H. W. Johnson

For the treatment of chronic cough, we have used several agents with some success, but these have not been prepared specifically for horses. We need a vaccine that is sensitized and includes a combination of pertussis serobacterin mixed, catarrhalis serobacterin mixed, and possibly mixed equine bacterin and autogenous bacterins. This is obviously a job for a commercial veterinary drug company which has the trained personnel and facilities for the production of such a product.

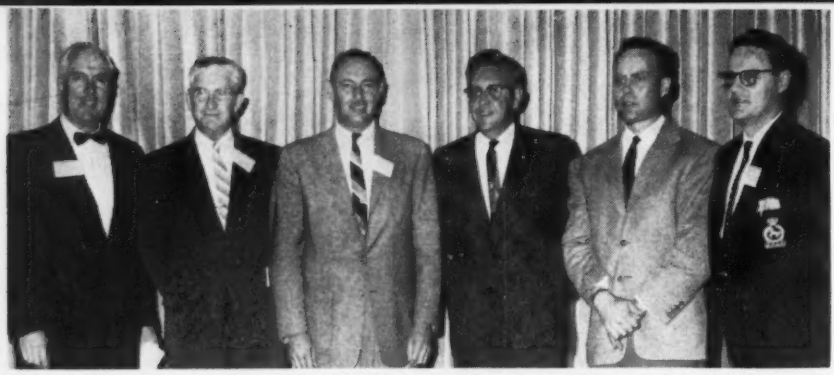
Dr. D. D. Delahanty

For a diagnosis of roaring, I lean heavily on finding atrophy of the cricoarytenoideus dorsalis muscle, feeling certain that the recurrent laryngeal nerve may well be the cause of the muscle atrophy. This can be palpated. As your fingers glide over the top-posterior portion of the normal larynx, they encounter a rounded muscle mass. In the true roarer, there is actually a crypt or a shallow well. Following workouts, with a lighter touch on the larynx, it is occasionally possible to palpate fremitus here.

Dr. M. E. Fowler

The term "heaves" as applied to horses should be considered a clinical sign rather than a specific disease entity. This syndrome can be caused by chronic bronchitis and allergic reactions (asthma-like), in addition to the true chronic pulmonary emphysema.

There is experimental evidence indicating that one cause of emphysema results from damage to the bronchial artery, and consequently from degeneration of alveolar tissue. This vessel was isolated during open chest surgery in the horse and injected with a sclerosing agent. Lesions of emphysema developed.



Officers of the American Association of Equine Practitioners are (left to right): Drs. Wayne O. Kester, chairman of the board; M. L. Scott, executive secretary; Jordan Woodcock, immediate past-president; M. B. Teigland, president; W. O. Reed, president-elect; and F. J. Milne, secretary-treasurer.

Dr. Jacques Jenny

"Pathogenesis of Bone and Joint Disease"

Most of the bone and joint lesions concerning the race track veterinarian are the direct or indirect result of a single trauma or the summation of stresses. This should not be surprising if we consider the speed of todays' races. A horse carrying 110 pounds in 34 seconds over ⅜ of a mile, thrusts a kinetic energy of 1,850,000 foot pounds on the leading front leg.

Dr. J. D. Wheat

"Contraindications in Bone and Joint Surgery"

Not every horse with exostosis or fractures of the carpus is a suitable subject for surgery. Without eliminating those that looked unfavorable from the standpoint of chronicity and excessive degeneration, I have observed that the only ones that result in a high degree of success are those that have a bone chip which is free of the carpal bone from which it originated, and there is no concurrent secondary exostosis or other degenerative changes.

Dr. William O. Reed

"The Humane Aspect of Bone and Joint Injuries and Initial Therapy"

In the treatment of severe bone and joint injuries we find the administration of tranquilizers immediately a great asset. Otherwise, a simple fracture may result in a badly comminuted one as a result of irrationality on the part of the horse. Control of pain is a necessity also. For this we prefer meperidine. Next, the fracture must be immobilized as quickly as possible. Swelling of joints may be prevented by the immediate application of a plaster cast. The old idea of allowing the swelling to subside before applying a cast has given way to the newer procedure of applying a cast even when swelling is present. The cast should be replaced as often as indicated by the subsequent reduction of swelling. It is also our opinion that no horse should be euthanatized on the race track proper. Before this occurs, there should be adequate consultation between race track veterinarians and stable veterinarians.

First Hip Dysplasia Meeting Held

The first meeting of the AVMA Panel on Hip Dysplasia, which will seek to prescribe acceptable equipment and establish standards of diagnosis, was held at the AVMA central offices in Chicago, March 3, 1961.

Recognizing the need for uniform information on hip dysplasia, the AVMA Council on Veterinary Service appointed a panel of 9 veterinarians. The 9 panelists were assigned to 3 committees: one to study normal positioning, anesthesia, and restraint; another to study radiologic equipment and radiologic evaluation; and the last to study normal hips and the diagnosis and classification of dysplastic hips.

Panel members are: Committee on Normal Positioning, Anesthesia, and Restraint —Drs. Wayne H. Riser (ISU '32), chairman; William C. Banks (TEX '41); and B. F. Hoerlein (COL '43); Committee on Radiological Equipment and Radiological Evaluation—Drs. W. H. Rhodes (UP '55), chairman; W. D. Carlson (COL '52); and E. P. Leonard (COR '34); Committee on Normal Hips and Diagnosis and Classification of Dysplastic Hips—Drs. G. B. Schnelle (UP '26), chairman; P. E. McClave (COL '37); and Paul Husted (UP '53). General chairman at the panel meeting and representative of the Council on Veterinary Services was Dr. Kenneth Whittington (AUB '42).

The 3 committee members in each subject area compiled information on their specific subject. At the meeting of the entire panel in Chicago, the work of the 3 committees was integrated and reviewed by all 9 panelists.

The panel agreed there was a need to prepare a "set of standards to bring order out of former confusion." At the meeting they agreed on diagnostic methods, minimal equipment, and general criteria for rendering a diagnosis of hip dysplasia. They discussed the relation of such factors as positioning, age, and heredity to hip dysplasia.

The report of this panel will be reviewed by AVMA's Council on Veterinary Service. It will then go to the Executive Board and then to the AVMA House of Delegates at its meeting in Detroit next August. Panel members said the report will be a practical guide to help practitioners do a uniform job of diagnosing hip dysplasia.

Hip dysplasia is fast becoming a common problem in America's canine population — especially in certain breeds of dogs. Because of this, the report of this panel will be important not only to veterinary practitioners who are diagnosing the condition, but also to breed associations and to agencies who use dogs to perform sentry, police, or guide services. Since hip dysplasia cannot be effectively treated, studies must be geared toward eliminating it.

The findings of this panel may also be of some help to human beings. A problem similar to hip dysplasia is said to occur in 3.8 of every 100,000 children and 30 to 50% of cases of arthritis of hips in human beings over age 50 can be traced to dysplasia.

AVMA Council on Research Meets

The Council on Research of the AVMA met in Chicago March 12-13, 1961.

Out of 23 applicants for AVMA fellowships, the Council selected 12 as possible recipients. However, funds may not be available to support all 12 selections. In some cases, the fellowship grants will depend upon the success of the AVMA Research Fund-Raising Campaign now in progress.

Shown at their recent meeting, the Council on Research members are (left to right): Drs. Rue Jensen (COL '43), Fort Collins, Colo.; William A. Hagan (KSU '15), Ames, Iowa; Richard D. Turk (KSU '33), College Station, Texas; Carl Brandly (KSU '23), Urbana, Ill.; C. Roger Smith (OSU '44), Columbus, Ohio; T. Carl Jones (WSU '35), Boston, Mass., chairman; L. Meyer Jones (ISU '39), Chicago, Ill., staff consultant; Robert Getty (OSU '40), Ames, Iowa; George Poppensiek (UP '42), Ithaca, N.Y.; George Edds (TEX '36), Fort Dodge, Iowa; and Lloyd C. Ferguson (OSU '34), East Lansing, Mich.

The Council voted to renew 2 current fellowships. Since the program began in 1942, more than 50 veterinarians have received financial assistance on basic research projects from the AVMA.

The Council also nominated a candidate for the AVMA Practitioners Research Award to be given at the AVMA convention in Detroit next August. This is a special award not given each year.

The Council made recommendations pertaining to AVMA representatives to other scientific organizations and on Cooper-Griffiths-type legislation, which will be presented to the AVMA Executive Board at its meeting April 6-7.

The 10-member Council on Research has 5 committees of 3 members each. The committees are the executive committee, the committee on goals and means, the committee on the *American Journal of Veterinary Research*, the committee on liaison, and the committee on the AVMA Practitioners Research Award. Council chairman is Dr. T. Carl Jones (WSU '35), Boston, Mass. AVMA Council members are elected by the House of Delegates, the body of locally elected representatives that reflects the thinking of the veterinary profession across the nation.

High Priority for Sheep Parasite Research

At the 13th meeting of the Sheep and Wool Research and Marketing Advisory Committee, held in Washington, D.C., on Nov. 2-4, 1960, recommendations to the USDA for new and expanded research included specific recommendations in which parasites of sheep and goats were placed in a 3rd place priority position preceded only by farm sheep breeding and improvement of mohair production.

The following paragraphs are contained in the official report of the meeting, available from the executive secretary of the committee, ARS, USDA, Washington, D.C.:

> Parasitism is the primary disease hazard to successful sheep raising in this country. No effective control measures exist for nearly half the known parasites affecting sheep. The estimated annual loss to the nation's sheep and goat industry exceeds $40,000,000 in addition to the half-billion dollar loss to other livestock. While parasites cause some of the most serious diseases of sheep, most of the damage comes from the insidious undermining of the health of animals, disrupting productive activity through retarded growth, unthrifty appearance, impaired meat and wool, and the expense of treatments if known. Many parasites attack other animals including man. Research needs to be initiated on:
>
> 1) known parasites and parasitic diseases on which no work is in progress;
>
> 2) the phenomena of the host-parasite relationship pertaining to biological and other controls.
>
> Research needs to be expanded on:
>
> 3) most of the parasites and parasitic diseases on which limited work is now in progress;
>
> 4) the relationships of breeding, feeding, and management of sheep on parasite infestation and prevention;
>
> 5) the development and classification of materials and information on the occurrence, distribution, and identification of important parasites of food and animals including man.

Physiology of reproduction in sheep was given 6th place priority; relation of soils to mineral nutrition, 9th place; infectious diseases of sheep, 11th place; noninfectious and metabolic disorder, 14th place; insects and ticks affecting sheep, 16th place.

It was reported that infectious diseases of sheep and goats are responsible for an estimated annual loss of $15,000,000 to the industry.

Diseases on which work should be expanded are bluetongue, ulcerative dermatosis, scrapie; and should be continued on vibrionic abortion and Johne's disease. Research should be initiated on foot rot, mastitis, virus abortion, ecthyma, listeriosis, and progressive pneumonia.

Special attention needs to be given foot rot in sheep which is causing serious loss to many sheep producers, particularly in farm flocks. It has put some farm flock operators out of the sheep business.

Annual losses due to noninfectious diseases were estimated to be more than $3,000,000. Specifically, research should be expanded to provide further knowledge of: (1) basic microbiology and physiology of ruminants and the relationships of plant constituents to animal metabolism; (2) the toxic elements of known and suspected

poisonous forage plants and of toxic elements found in sheep feeds; (3) the acute and chronic toxic effects of plants and agricultural chemicals on animals; and (4) physiologic disturbances associated with disorders such as overeating, pregnancy disease, bloat, feedstuff tetany, urinary calculi, and hormonal and other disturbances due to feed additives. It was suggested that the extensive work on bloat may be overemphasizing this condition at the expense of other physiologic disturbances of equal importance.

Dr. Hadleigh Marsh (GWU '12), Veterinary Research Laboratory, Agricultural Experiment Station, Bozeman, Mont., is a member of the 10-man committee.

Study of Normal Electrocardiogram in Dogs Planned

A study designed to establish certain standards for the normal electrocardiogram in dogs is under way at the University of Pennsylvania School of Veterinary Medicine. It is being sponsored by the Mark L. Morris Animal Foundation.

In the study, complete electrocardiograms will be taken of about 100 dogs free of heart disease. It will be conducted under the supervision of Drs. David K. Detweiler (UP '42) and Donald F. Patterson (OKL '54), of the University.

Society on Breeding Soundness of Bulls Meets

The annual meeting of the Society for the Study of Breeding Soundness of Bulls was held at Colorado State University Veterinary Hospital, Fort Collins, Feb. 18-19, 1961.

This group was formed in 1954 by Dr. H. J. Hill (COL '46) and 12 other veterinarians as the Rocky Mountain Society for the Study of Breeding Soundness in Bulls. By 1960 the group had 248 members scattered throughout 43 states and Canada.

At the business session of the meeting there was a proposal to extend the scope of the society to include all phases of reproduction in domestic animals. A report on the examination of rams for breeding soundness was also given at the business session.

Other activities at the meeting included the examination of bulls, with detailed presentations on semen quality and discussions of specific reproductive disorders and abnormalities, demonstrations of semen collection and laboratory techniques, and a session devoted to infectious diseases affecting bovine reproduction given by Dr. David E. Bartlett (COL '40), American Breeders Service, Chicago, Ill.

Officers of the society are: Drs. H. J. Hill (COL '46), Denver, Colo., chairman; James Bell (COL '56), Logan, Utah, vice-chairman; and E. J. Carroll (COL '57), Fort Collins, Colo., secretary-treasurer.

Dr. J. O. Knowles Receives Zeta Award

Dr. J. O. Knowles (UP '38), AVMA Executive Board Chairman, is presented with the Zeta Award of the Omega Tau Sigma Fraternity, Auburn, Ala., by president James D. Brogli. The award was presented to Dr. Knowles in recognition of his outstanding contributions to veterinary medicine. The fraternity has presented the award for 8 consecutive years. In accepting the award, Dr. Knowles urged the students to take an active interest in legislation after graduation. "If we speak up, we will be heard," he said.

Effects of Butazolidin Under Study

The effects of phenylbutazone (Butazolidin) on race horses is being studied at the University of Pennsylvania's School of Veterinary Medicine. The study is being performed under a grant from the Racing Chemistry Research Fund.

Supervising the project is Dr. John E. Martin (UP '42), associate professor of therapeutics, and associated with him is Dr. Carl Gabriel, a pharmacologist.

Dr. Martin will study the action of phenylbutazone on pulse rate, respiratory rate, blood pressure, body temperature, blood composition, and appetite. Methods will be devised to determine the drug's analgesic properties and its effect on racing performance.

Research in Trout Cancer Slated

A 3-year study of hepatoma has been begun at Bellvue, Colo., by Drs. Rue Jensen (COL '43), dean, Colorado State University College of Veterinary Medicine, and Howard A. Tanner, Colorado State University, Colorado Cooperative Fishery Research Unit.

Total cost of the study will probably exceed $150,000. An application for a grant of $116,700 has been filed with the National Institute of Health. The 2 professors plan to study some possible causes of hepatoma.

Dr. Gordon Solomon, Ph.D. candidate at Colorado State University, has been assigned to the project and will work under Dr. Jensen's direction.

Although the project has already been started, its extensiveness will be determined by whether the grant is awarded.

Dr. W. G. Evans Appointed to USDA Washington Staff

Dr. Winton G. Evans (MIN '52) has been appointed staff veterinarian, brucellosis eradication, Animal Disease Eradication Division, USDA. Dr. Evans, who was formerly assistant veterinarian in charge, Springfield, Ill., is now stationed in Washington, D.C.

Following graduation, Dr. Evans entered federal service with the Animal Disease Eradication Division in Minnesota as area and district supervisor. In 1957 he participated in the fourth veterinary training development program, and was trained in radiologic defense. He was appointed assistant veterinarian in charge in Illinois in July, 1958.

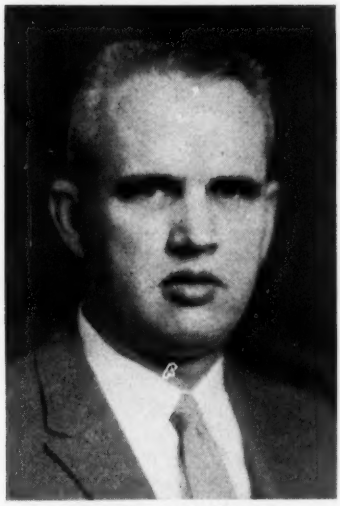
Dr. Winton G. Evans

Dr. Evans is a member of the AVMA and the National Association of Federal Veterinarians. He is co-author of "Report of Oklahoma Anthrax Outbreak 1957."

Dr. N. L. Meyer Promoted

Dr. Norvan L. Meyer (KSU '47), has been named chief staff officer, emergency diseases, Animal Disease Eradication Division, USDA, Washington, D.C. He was formerly assistant chief staff officer, emergency diseases.

For 2 years after graduation from veterinary college, Dr. Meyer was in general practice in Iowa and Missouri. He entered federal service with the former Bureau of Animal Industry in January, 1950. From January, 1950, until April, 1953, he was in Mexico as area supervisor with the foot-and-mouth disease eradication program. From April, 1953, to November, 1954, he participated in the vesicular exanthema eradication program in Indiana; he was district supervisor in that state from November, 1954, to October, 1956. He then participated in the third veterinary administrator development program. Dr. Meyer was assist-



Dr. Norvan L. Meyer

ant veterinarian in charge, Springfield, Ill., and Des Moines, Iowa, from July, 1957, to June, 1959, and was then appointed assistant chief staff officer, emergency diseases, Washington, D.C.

Dr. Meyer is a member of the AVMA, the U.S. Livestock Sanitary Association, and the National Association of Federal Veterinarians.

Dr. R. C. Reisinger Transferred

Dr. Robert C. Reisinger (AUB '44) has been transferred to the Animal Disease Eradication Division, USDA, as assistant chief officer, emergency diseases. He was formerly project leader, pasteurellosis research, Animal Disease and Parasite Research Division, Beltsville, Md., a position he held from July 8, 1957, to Oct. 30, 1960.

Dr. Reisinger received his Master of Science degree from the Department of Veterinary Science, University of Wisconsin, in 1957. Following graduation from veterinary college he engaged in large animal practice for a year, specializing in horses. He was employed by the United Nations, the Economic Cooperation Administration, and the Department of the Army in Greece, Poland, Mexico, China, Ethiopia, Formosa, Japan, and Korea, from 1945 to 1954. From October, 1951, to April, 1954, he was chief of the Veterinary and Livestock Section of the United Nations Civil Assistance Command in Korea. From 1954 to 1955, he again engaged in veterinary practice.

Dr. Reisinger entered the Animal Disease and Parasite Research Division of the Agricultural Research Service in 1957 as project leader of pasteurellosis research, and in this position also did research on shipping fever of cattle and fowl cholera. He was the first to report isolation of myxovirus parainfluenza from cattle and to relate this virus as an etiologic agent in the shipping fever complex.

Dr. Robert C. Reisinger

Publications by Dr. Reisinger include reports on rinderpest, hog cholera, calf scours, shipping fever, and fowl cholera. In June, 1951, he was the recipient of a letter of commendation from the commissioner of agriculture, Taiwan Provincial Government, for directing the eradication of rinderpest from Taiwan. He was made an honorary life member of the Tokyo Veterinary Medical Association in 1951. In 1952 he was given a Presidential Commendation by President Syngman Rhee of the Republic of Korea, and in 1954 was honored by being the first foreigner ever to receive the Korean "Medal for Industrial Merit." These honors were awarded him for his work in the development, production, and use of several animal vaccines, and for his part in the rehabilita-

tion of the veterinary services and livestock industry of the Republic of Korea.

Dr. Reisinger is a member of the Virus Committee of the U.S. Livestock Sanitary Association and a member of the Conference Research Workers in Animal Diseases. He is also a member of the AVMA and the executive committee of the District of Columbia V.M.A.

Dr. R. L. Alkire Transferred to New Jersey

Dr. Robert L. Alkire (ISU '36) has been appointed veterinarian in charge of the Trenton, N.J., Animal Disease Eradication Division station, USDA Agricultural Research Service. He was formerly veterinarian in charge at the Hartford, Conn., station.

Since graduation from veterinary college, Dr. Alkire has served at USDA stations at Iowa, Maryland, New Jersey, Michigan, and

Dr. Robert L. Alkire

Connecticut. During World War II, he served in Europe with the Army Veterinary Corps and was discharged as a Major.

While stationed in New Jersey, Dr. Alkire served on the New Jersey V.M.A. executive committee, and also as chairman of the public relations committee. After transfer to Connecticut, he became a member of the executive committee of the Connecticut V.M.A. Dr. Alkire is an AVMA member.

Dr. C. E. Stevens Joins USDA

Dr. Charles E. Stevens (MIN '55) has joined the staff of the Animal Disease and Parasite Research Division, USDA, at its

Dr. Charles E. Stevens

National Animal Disease Laboratory at Ames, Iowa. Dr. Stevens will perform research on ruminant digestive disorders and related dysfunctions in cattle.

Dr. Stevens was formerly on the faculty of the University of Minnesota where he was a teaching assistant in veterinary physiology and pharmacology. After receiving his Ph.D. degree in 1958, he remained on the university staff as a research associate.

Dr. A. G. Edward, Jr., Appointed to New Iowa Laboratory

Dr. Alfred G. Edward, Jr. (COL '52), has been assigned to the staff of the National Animal Disease Laboratory at Ames, Iowa, where he is veterinarian in charge for the production, procurement, and quarantine of disease-free experimental animals.

Dr. Alfred G. Edward

Dr. Edward joined the Animal Disease and Parasite Research Division of USDA in 1955 as a staff member of the Plum Island Animal Disease Laboratory, Orient Point, N.Y., where for 3 years he has been in charge of the animal quarantine program. He is the author of publications on foot-and-mouth disease and laboratory animal production. He is a member of the AVMA.

Among the States and Provinces

California

DR. A. C. BOYD NAMED VETERINARIAN OF THE YEAR.—Dr. Arthur G. Boyd (MCK '18), assistant director, California Department of Agriculture, has been named California Veterinarian of the Year by the California V.M.A.

The official presentation of the award will be made to Dr. Boyd at the association's annual meeting in Long Beach next October. His name will also be submitted as a candidate for the AVMA award to be presented at Detroit in August.

Following graduation, Dr. Boyd practiced veterinary medicine in Michigan. He served as a lieutenant in the Veterinary Corps of the U.S. Army during World War I. After the war he returned to Michigan and directed the first animal disease diagnostic laboratory in that state and also performed laboratory technical work for the Michigan State Department of Public Health. Later he served with the U.S. Bureau of Animal Industry in the supervision of the manufacture of animal biological products.

Dr. Boyd has served as veterinarian in the California Department of Agriculture since April, 1922. He worked in the field and, during his early years of service, he pioneered the eradication of sheep scabies and bovine tuberculosis. He was promoted rapidly and became assistant chief, Division of Animal Industry in 1952; in 1953, he was appointed chief. Dr. Boyd is also executive secretary of the California State Board of Agriculture.

During his career Dr. Boyd played a leading role in organizing California's meat inspection system, directed the 1924 and 1929 campaigns to eradicate foot-and-mouth disease, organized the California Bureau of Livestock Disease Control, worked toward the development and direction of the state's disease diagnostic laboratories, and was a leader in California campaigns to eradicate glanders, cattle scabies, dourine, vesicular exanthema, scrapie, and bovine brucellosis.

He was presented with the golden sheepskin by the California Wool Growers Association, making him a member of the "Order of the Golden Fleece," in August, 1960. Dr. Boyd is a member of the AVMA and the U.S. Livestock Sanitary Association.

Colorado

VETERINARIAN OF THE YEAR NAMED AT CONFERENCE FOR VETERINARIANS.—Dr. G. H. Gilbert (COL '41) was named Colorado Veterinarian of the Year at the 22nd annual conference for veterinarians at Colorado State University in February.

The award was determined on the basis of accomplishments of the nominees during the past year. Dr. Gilbert did an outstanding job as secretary of the Colorado V.M.A., and as chairman of the convention committee for the 1960 AVMA Convention in Denver last August. Besides maintaining the Stauffer-Gilbert Veterinary Hospital at Arvada, Colo., Dr. Gilbert is mayor of Ar-

vada, secretary of the Colorado Municipal League, teacher of parliamentary law at Regis College, Denver, and chairman of the Denver Metropolitan Cooperative Commission. He was also a former state Republican chairman.

Guest speaker at the meeting, Mr. Walter B. Cooper, president of the Colorado Board of Agriculture, presented a talk entitled "The Little Man Who Wasn't There When Responsibilities Were Passed Around." Mr. Cooper stated that it is the responsibility of every veterinarian to support not only his professional organizations but also community organizations such as the church, schools, community chest, chamber of commerce and service organizations. "You have a responsibility to the merchants of your community and they have a responsibility to you," he said.

The annual meeting of the Society for Study of Breeding Soundness in Bulls and a Region 4 meeting of the American Animal Hospital Association were held in conjunction with the conference. There was an attendance of 290.

Florida

VETERINARIAN SELECTED CHAIRMAN OF RURAL HEALTH COMMITTEE.—Dr. George Yopp (AUB '53), Jacksonville, has been selected as the 1961 chairman of the Florida Committee on Rural Health. Dr. Yopp had been serving as the representative of the Florida State V.M.A.

Other member organizations of the committee are the Florida Agricultural Extension Service, the Florida Farm Bureau Federation, the Florida Medical Association, the Florida State Board of Health, and the Florida State Pharmaceutical Association.

Illinois

ILLINOIS V.M.A. MEETS.—At the 79th annual convention of the Illinois State V.M.A. in Chicago, Feb. 20-22, 1961, the association presented an honorary membership to Mr. J. J. Shaffer, managing director of Chicago's Anti-Cruelty Society.

The award was presented to Mr. Shaffer in recognition of his success in promoting good working relationships between humane organizations and veterinarians. It was the first time in the Illinois State V.M.A.'s 79-year history that a humane society worker was presented such an award. Mr. Shaffer is the third person to become an honorary member of the association. Previous recipients were an agricultural leader and a public health official.

Highlight of the association's business meeting was the passage of a resolution requesting that the University of Illinois administration "be urged to give the highest priority for funds for early planning and construction of facilities needed to provide the necessary clinical and teaching facilities of the College of Veterinary Medicine, and that the university administration also be urged to give judicious consideration to the College of Veterinary Medicine's projection of Illinois' expanding veterinary medical educational needs through this decade." The resolution called the clinical building and facilities presently used by the College of Veterinary Medicine "inadequate and substandard to meet the current and expanding teaching needs and obligations of the College, as prescribed by the Council on Education of the American Veterinary Medical Association."

Officers of the Illinois State V.M.A. are: Drs. J. J. Smith (KSU '45), Waverly, president; O. Norling-Christensen (OSU '32), Wilmette, president-elect; R. P. Link (ISU '34), Urbana, treasurer; and C. B. Hostetler (KSU '43), Des Plaines, executive secretary.

At the meeting 72 new members were accepted into the association bringing total membership to 850.

Indiana

INDIANA V.M.A. ELECTS NEW OFFICERS, REVIEWS ACTIVITIES.—New officers of the Indiana V.M.A. elected at the association's 77th annual meeting in Indianapolis, Jan. 11-13, 1961, are: Drs. T. W. Freas (OSU '51), Veedersburg, president; George Burch (TEX '38), New Augusta, president-elect; Louis Snider (KSU '46), New Palestine, vice-president; Fred Hall (COR '23), Lafayette, secretary; Stanley Bowers (MSU '55), New Augusta, treasurer; and V. K. McMahan (KSU '41), Fort Wayne, chairman of the Board.

Recent accomplishments of the Indiana V.M.A. reviewed at the meeting were:

- Passage of a new Veterinary Practice Act for the State of Indiana.
- Adoption of a new constitution and by-laws for the association.
- Cooperation with the new veterinary school at Purdue University through assisting in career recruitment, offering financial aid to students, sponsoring attendance of students at state and AVMA meetings, and establishing a memorial library.
- Furtherance of liaison between association and feed dealers through state and district nutrition meetings.
- Publication of *The Hoosier Veterinarian*, a quarterly state association paper.

• • •

MICHIANA V.M.A. ELECTS NEW OFFICERS.—Officers of the Michiana V.M.A. for 1961 are: Drs. Richard Schaub (MSU '43), New Carlisle, president; A. C. Dufour (MSU '46), Elkhart, president-elect; R. W. Worley (OSU '43), South Bend, acting vice-president; R. N. Dale (KSU '59), LaPorte, secretary; and C. M. Poole (OKL '57), Elkhart, treasurer.

Manitoba

MANITOBA V.M.A. RECOMMENDS INTERNSHIP FOLLOWING GRADUATION.— At its 71st annual meeting, the Manitoba V.M.A. officially recommended a 6-month internship following graduation from veterinary school and preceding entrance into private practice.

The meeting, which was attended by 75 veterinarians, was held in Winnipeg, February 27-28.

Officers elected at the meeting are: Drs. J. S. Thomson (ONT '42), Portage La Prairie, president; I. Goossen (ONT '44), Emerson, vice-president; and N. E. Stanger (ONT '55), Winnipeg, secretary-treasurer.

Massachusetts

DR. K. L. BULLIS AND WIFE RETIRE.—Dr. Kenneth L. Bullis (ISU '28), member of the veterinary science department of the University of Massachusetts, and head of the department since 1951, and his wife Katherine, a teacher of freshman chemistry since October, 1942, retired Jan. 28, 1961. The Bullis' have given a total of nearly 50 years' service to the university.

Dr. Bullis joined the staff as assistant veterinary pathologist and served as acting chief of laboratory and research professor before becoming department head. From 1929 to 1934, he conducted service work in pullorum disease eradication and, from 1934 until 1951, poultry diagnostic service work.

He has seen the veterinary science professional staff grow from 6 persons in 1929 to 18 in 1960. A branch poultry diagnostic laboratory was added at the Waltham Field Station in 1950. Since 1951, the Department of Veterinary Science has been expanded in microscopic pathology, its research program, large animal diagnostic services, poultry disease research, and its physical plant. Paige Laboratory, present home of veterinary science, was completed in 1951, a poultry isolation building in 1952, and the Thayer Building, a large animal isolation building, in 1957.

Dr. Bullis was a practitioner in veterinary medicine at Chicago Heights, Ill., and assistant veterinarian with the California Department of Agriculture in San Francisco before joining the university staff. He is a member of the AVMA and the Massachusetts V.M.A., as well as of the International Academy of Pathology and the New York Academy of Sciences; he has attended 3 international veterinary congresses.

Michigan

BIRDS MAY TAKE OVER AS MOST POPULAR PET SAYS VETERINARIAN AT MICHIGAN CONFERENCE.—Dogs and cats are being challenged by birds for the title of the nation's most popular pet said Dr. K. M. Friedburg (OSU '42), Three Oaks, at the recent conference of veterinarians at Michigan State University.

Dr. Friedburg said there are 26 million dogs, a like number of cats, and 22 million pet birds in this country. There are about 15 million parakeets and 7 million canaries, or one pet bird in every 4th home in America, he said.

As the pet bird population grows, so will the demand for veterinary services for them, he pointed out.

The Michigan State University Veterinary Student Glee Club performed at the university's recent Postgraduate Conference for Veterinarians. The glee club was organized in 1957 on the students' initiative as an activity of the Student Chapter of the AVMA. Members of all 4 classes participate. The group's conductor is Barry Torino, a senior from Hillside, N. J. This picture was printed above the wrong legend in the April 1 issue of the JOURNAL.

Missouri

MISSOURI V.M.A. MEETS.—At the annual meeting of the Missouri V.M.A. in St. Louis last February, the association passed a resolution putting the Missouri V.M.A. on record as requesting that all city and county boards of health have a veterinarian.

Also at the meeting the Association passed motions to:

- Support a proposed bill before the Missouri legislature to provide milk price stabilization.
- Hire legal help to draft and introduce a bill revising the Missouri Veterinary Practice Act. The new act will do 3 things: (1) give the board of examiners authority to hire legal counsellors and investigators; (2) provide a temporary permit for graduate veterinarians between the time of graduation and the next examination by the board of examiners; (3) permit the board of examiners to develop rules and regulations for ethical conduct.
- Support the philosophy of membership in state V.M.A.'s as a requisite for AVMA membership.
- Not support the proposal for mail ballot election of AVMA officers.

Officers elected at the meeting are: Drs. F.D. Gentry (MSU '45), Springfield, president; R. M. Keith (KSU '44), Kirkville, president-elect; L. L. Rice (MO '51), Shelbina, vice-president; and Paul Spencer (KSU '51), Jefferson City, secretary-treasurer and delegate to the AVMA convention.

Dr. A. H. Groth (ISU '31), Columbia, dean of the School of Veterinary Medicine at the University of Missouri, was named Missouri Veterinarian of the Year.

• • •

KANSAS CITY V.M.A. ELECTS NEW OFFICERS.—New officers of the Kansas City V.M.A. are: Drs. Harold W. Pilcher (MO '50), Gashland, president; Robert E. Hertzog (MO '59), Alton, vice-president; and Iain M. Paton (GLA '48), Kansas City, secretary-treasurer.

New Jersey

COURSE ON EPIDEMIOLOGY OFFERED.—A course in principles of epidemiology, sponsored by the Veterinary Medical Association of New Jersey, the U.S. Public Health Service, and the New Jersey State Department of Health was attended by 74 persons. Forty-one were veterinarians, 21 were employees of local health departments, and 12 were employees of the State Department of Health.

Lectures covered principles of epidemiology food-borne diseases; use of statistics; staphylococcic diseases; zoonoses; and polio

and the enterovirus diseases. The course was given in 5 day-long sessions.

Dr. Roscoe P. Kandle, state commissioner of health, noted that more than 10% of the veterinarians in the state registered for the course. "Observations of veterinarians are often indispensable in detecting and tracing animal diseases transmissible to human beings," Dr. Kandle said. "As an example, the outbreak of eastern encephalitis among human beings in New Jersey in 1959 had as a forerunner a greater number of cases than usual of eastern encephalitis among horses and farm pheasant flocks."

New York

NEW YORK CITY V.M.A. WRITES COLUMN FOR AMERICAN KENNEL CLUB.—Since May, 1960, the public relations committee of the New York City V.M.A. has been preparing a monthly column entitled "A Word from the Veterinarian," for the magazine *Pure-Bred Dogs—American Kennel Gazette.*

The magazine is the official publication of the American Kennel Club. It has an extensive national and international circulation, especially among breeders. The following statement is published with each column:

"This article is prepared by the Public Relations Committee of the Veterinary Medical Association of New York City. We invite your queries pertaining to dogs and their health. All material appearing here is written by members of the Veterinary Medical Association of New York City. Please address your queries to: 'A Word from the Veterinarian,' Pure-Bred Dogs, 221 Park Avenue South, New York 3, N.Y."

No credit or byline is given to any individual member writing the material. In answering questions submitted by readers, care is taken not to diagnose or prescribe treatment. All copy is carefully edited by the public relations committee.

• • •

SCABIES CONTROL PROGRAM BEING FORMULATED.—The New State Department of Agriculture and Markets is moving to put New York into the classification of a scabies eradication area. The action has been spurred by the newly formed Committee on Sheep Diseases of the New York State V.M.S.

New York State has been classified as a scabies infected area by the USDA. Sheep from infected areas are prohibited from entering "scabies free" or "scabies eradication" areas, except upon presentation of an approved health certificate from authorities in the infected area or from a licensed veterinarian, signifying that the sheep are free of scabies or have been dipped in an approved insecticide not more than 10 days before shipment.

As a result of 2 recent meetings of the Committee on Sheep Disease and consultations with the Department of Agriculture and Markets, the Department has formulated rules and regulations pertaining to the movement of sheep and lambs within New York State and to and from other states. Public hearings on the newly formulated regulations must be held before they are activated. At one hearing held during the 4th annual veterinary conference at Ithaca, commercial and purebred flock owners and veterinarians showed interest in instigating a scabies eradication program.

Chairman of the Committee on Sheep Diseases of the New York State V.M.S. is Dr. George T. Dorney (COR '39).

• • •

WESTERN NEW YORK V.M.A. ELECTS NEW OFFICERS.—New officers elected by the Western New York V.M.A. at its winter meeting in Buffalo, Dec. 15, 1960, are: Drs. Stanley B. Jacobs (KSU '49), Rochester, president; Gerald Ward (COR '49), Olean, president-elect; and Frank E. McClelland, Jr. (COR '40), Buffalo, secretary-treasurer.

North Dakota

VETERINARY CONFERENCE HELD.—The Department of Veterinary Science, North Dakota State University, held a short course for veterinarians on Feb. 1-2, 1961. Highlighting the program were 2 reports given by Dr. Glenn C. Holm (ISU '36), dean of the College of Veterinary Medicine, Oklahoma State University, entitled "The Practitioner's Role in Veterinary Education," and "Breeding Problems in Livestock."

Dr. B. N. Frank (COL '39), practitioner from Sterling, Colo., gave 2 reports, one on feedlot diseases and the other on new feedlot arrivals.

Others appearing on the program were

Drs. F. M. Bolin (ISU '29), acting head, department of veterinary science, North Dakota State University; I. A. Schipper (MIN '51), associate veterinarian, North Dakota State University; C. B. Bjornson (OSU '45), assistant veterinarian, North Dakota State University; J. V. Bundy (MIN '58), practitioner; D. E. Flagg (OSU '45), state veterinarian; and T. R. Myers (COL '31), government veterinarian in charge.

About 60 veterinarians from North Dakota, South Dakota, and Minnesota attended the conference.

• • •

NEW ASSOCIATION FORMED.—A new veterinary association, the West River Veterinary Medical Association, has been formed in North Dakota.

Officers of the new association are: Drs. T. Orchard (COL '54), Bismarck, president; and Robert Nelson (MIN '59), Hebron, secretary-treasurer.

• • •

PUBLIC RELATIONS COMMITTEE ACTIVE IN FIRST YEAR.—In its first year of existence, the Public Relations Committee of the North Dakota Veterinary Medical Association has swung into full scale activity.

The committee has purchased a projector to be used at fairs and meetings as a public relations aid in telling the story of the veterinary profession.

It has also prepared a special kit which was distributed to North Dakota high schools on the careers of veterinarians. The committee has made known to career counselors and high schools the availability of a veterinarian to appear on high school career days.

As a service to students already attending veterinary schools, the committee has prepared a letter telling of the needs of the state for veterinary services.

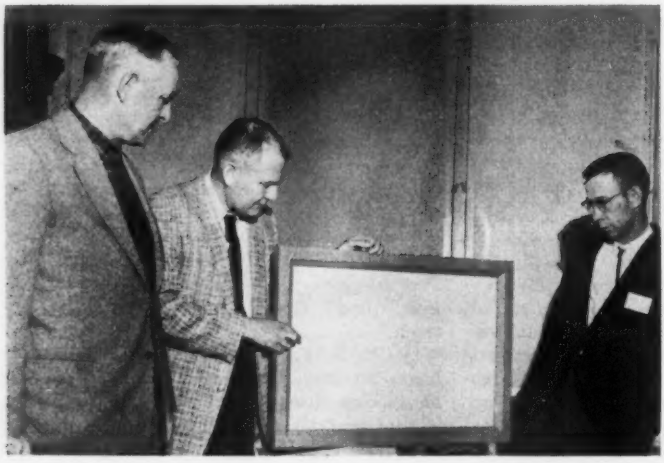
Committee members are Drs. I. A. Schipper (MIN '51), Fargo, chairman; J. B. Watkins (ISU '51), Minot; and J. D. Vagneur (COL '41).

Ohio

OFFICERS ELECTED.—Officers elected at the 77th annual meeting of the Ohio State V.M.A. in Toledo in February are: Drs. C. S. Alvanos (MSU '39), Toledo, president; James K. Bratton (OSU '52), Athens, president-elect; William L. Ingalls (OSU '42), Reynoldsburg, vice-president; Harry G. Geyer (OSU '36), Columbus, secretary; John H. Helwig (OSU '37), Columbus, treasurer; and Russell E. Rebrassier (OSU '14), Columbus, executive secretary.

Oregon

OREGON V.M.A. MEETS, INSTALLS NEW OFFICERS.—New officers installed at the 50th annual convention of the Oregon V.M.A. in Portland, February 2-4, are: Drs. Ray Storey (WSU '41), Molalla, president; S. E. McGough (WSU '51), Pendleton, president-



Educator and members of the North Dakota V.M.A. look over a recently purchased screen to be used in visually telling the story of the veterinary profession to groups with allied interests. They are: (left to right) M. G. Kruse, Board of Higher Education, Kindred, N. Dak.; Dr. I. A. Schipper; and Dr. R. C. Reed, president, North Dakota V.M.A.

elect; O. H. Muth (MSU '29), Corvallis, secretary-treasurer; and Dallen H. Jones (WSU '41), Roseburg, delegate to the AVMA convention.

Dr. Muth also received the Oregon V.M.A.'s first "Distinguished Achievement Award" for research work performed at Oregon State College in connection with development of a new treatment for control of white muscle disease, a degenerative disease of calves and lambs.

Convention attendees heard an appeal from Dr. Monroe Holmes (WSU '46), Oregon State Board of Health, for maximum immunization of pets to combat the threat of a possible rabies epizootic.

Also at the meeting, Dr. Donald Miller (OSU '36), assistant director, Animal Disease Eradication division, USDA, warned that the livestock industry faced a threat of "invasion" by foreign diseases currently decimating livestock populations in Asia and Africa. He urged that veterinarians, livestock producers, and health officials intensify efforts to recognize and report these diseases.

Dr. Ward Newcomb, Nebraska dentist who won recognition for a method of capping cows' teeth with steel crowns to prolong the life of the animal and increase milk production, demonstrated his technique to the Oregon veterinarians.

Instructors for the course came from the U. S. Public Health Service; the schools of public health of the Universities of Minnesota and North Carolina; the State Department of Agriculture; the Veterinary Medical Association of New Jersey; and the State Department of Health.

Veterinary Military News

Veterinary Aspects of Nuclear Medicine Course participants were:
First row: Major Milton A. Beerwinkle; Col. Charles E. Robinson, coordinator of training; Col. Robert H. Yager, director, Division of Veterinary Medicine; Mrs. Flo H. Ward, course director; Lt. Col. Harvey L. Rubin, deputy director, Division of Veterinary Medicine; Col. George D. Batcheldor; Lt. Col. Charles B. Frank.
Second row: Major William P. Hayman; Major Harold C. Davis; Lt. Col. Willys E. Lord; Lt. Col. Elmer R. Pede; Lt. Col. Warren J. Schneider; Lt. Col. John H. Harrison.
Third row: Capt. Ted M. Richardson; Major Donald W. Ringley; Lt. Col. Joseph L. Reid; Capt. James M. Lyday; First Lt. Henry K. Tom, Jr.; Capt. Walter H. Peacock.
Fourth row: Capt. Norman D. Jones; Capt. Paul J. Homme; First Lt. Jesse V. Unruh; First Lt. George L. Beckvermit; Capt. Ralph F. Ziegler.
Fifth row: Capt. William L. Jones, Jr.; Capt. Samuel W. Levingston; Capt. Arthur R. Smith.
This legend appeared under the wrong picture in the April 1 issue of the JOURNAL.

Army Curriculum Advisory Council Meets

The U.S. Army Curriculum Advisory Council met from February 27 to March 2 at the Army Medical Service Meat and Dairy Hygiene School, Chicago, to review the school's activities and programs.

The council also discussed the doctrines, problems and policies of the U.S. Army Veterinary Corps as well as quality control and assurance provisions, contractor inspection, and new Army regulations pertaining to the Veterinary Corps.

State Board Examinations

FLORIDA—June 12-17, 1961, Biscayne Terrace Hotel, Miami, Fla. Dr. E. F. Thomas, Secretary, 4937 S. Tamiami Trail, Sarasota, Fla.

GEORGIA—June 15-16, 1961. Atlanta, Ga., Dr. A. M. Mills, Secretary, 325 Pinecrest Dr., Athens, Ga.

IOWA—June 1-2, 1961, Division of Animal Industry, State House, Des Moines 19, Iowa. Dr. A. L. Sundberg, chief Division of Animal Industry, State House, Des Moines 19, Iowa.

MARYLAND—June 5-6, 1961, College Park, Md., 8:00 a.m. Applications must be returned by May 31, 1961. Dr. Harold S. Gober, Secretary-Treasurer, 5400 Park Heights Ave., Baltimore 15, Md.

MASSACHUSETTS—June 19-21, 1961, University of Massachusetts, Amherst. Applications must be filed by June 1, 1961. Dr. Edward A. Zullo, Secretary, Room 33, State House, Boston 33, Mass.

MICHIGAN—June 12-13, 1961, Auditorium, Giltner Hall, Michigan State University, East Lansing, Mich. Applications must be filed 15 days prior to examination along with $25 fee. Dr. John F. Quinn, Corresponding Secretary, 6th Floor, Lewis Cass Building, Lansing 13, Mich.

MISSOURI—June 1-2, 1961, School of Veterinary Medicine, University of Missouri, Columbia, Mo. Dr. L. A. Rosner, Chairman, Box 630, Jefferson City, Mo.

NEW HAMPSHIRE—July 5, 1961, State House, Concord, N.H., 9 a.m., Dr. Eric W. Simmons, secretary-treasurer, Exeter Road, North Hampton, N.H.

NORTH CAROLINA—June 21-23, 1961, Morehead-Biltmore Hotel, Morehead City, N.C. Dr. James I. Cornwell, secretary, P.O. Box 9038, Asheville, N.C.

OHIO—June 5-7, 1961, Sisson Hall, College of Veterinary Medicine, Ohio State University, Columbus, Ohio. Dr. H. G. Geyer, Executive Secretary, State of Ohio Department of Agriculture, Division of Animal Industry, Columbus 15, Ohio.

OKLAHOMA—May 24-26, 1961. College of Veterinary Medicine, Oklahoma State University, Stillwater, Okla. Applications must be filed 30 days prior to examination. Mrs. Bonnie Jean Meuffer, 4321 S. Lee, Oklahoma City, Okla.

OREGON—June 6-8, 1961, Hotel Multnomah, Portland, Ore. Application deadline one month prior to examination. Fee $25. Dr. C. R. Howarth, Secretary, 135 N. Highway, St. Helens, Ore.

SOUTH CAROLINA—June 15-16, 1961, Columbia Hotel, Columbia, S. Car. Dr. H. L. Sutherland, Secretary-Treasurer, Union, S. Car.

TEXAS—May 29-31, 1961. School of Veterinary Medicine, A. & M. College of Texas, College Station, Texas. Application deadline one month prior to examination. Mr. T. D. Weaver, Executive Secretary, 207 Capital National Bank Bldg., Austin 1, Texas.

UTAH—June—29, 1961, Department of Business Regulation and Registration, State Capitol Building, Salt Lake City, Utah, 9 a.m. Applications must be filed by June 15, 1961. Fee $15. Dr. Frank Lees, Director of the Office of Business Regulation and Registration, State Capitol Building, Salt Lake City, Utah.

WEST VIRGINIA—June 19, 1961, Capitol Building, Room 117, Charleston W. Va. Dr. H. J. Fallon, Secretary, 200 Fifth St., W., Huntington, W. Va.

WISCONSIN—June 26-27, 1961, Madison, Wis. Dr. A. A. Erdmann, Secretary, 6 W. State Capitol, Madison 2, Wis.

Deaths

Star indicates member of AVMA

★**J. Howard Brown** (KCV '14), 70, Tarboro, N.C., died Feb. 13, 1961.

Dr. Brown had practiced in Tarboro for 25 years. He was a past-president of the North Carolina V.M.A. and the author of a history of veterinary medicine of North Carolina. He was named North Carolina Veterinarian of the Year in 1955 and was made a life member of the AVMA in 1956.

Laurister N. Brown (ONT '29), 58, Auburn, Maine, died Feb. 9, 1961.

Dr. Brown was a member of the Maine V.M.A.

Dr. John W. Chenoweth, Sr. (WES '01), Albany, Mo., died Oct. 5, 1960.

Dr. Chenoweth was a general practitioner.

Loren D. Eastman (ONT '08), 87, Council Grove, Kan., died Jan. 31, 1961.

Dr. Eastman had practiced in Council Grove for 50 years before his retirement several years ago.

W. H. Emig (CVC '08), Chattanooga, Tenn., died Feb. 8, 1961.

Dr. Emig had retired from veterinary practice 10 years ago.

George W. Hare (GR '98), 96, Allegan, Mich., died Feb. 14, 1961.

Dr. Hare had practiced in Allegan for 63 years until his retirement 5 years ago.

★**Herbert P. Lefler** (OSU '15), 72, Fort Dodge, Iowa, died Jan. 28, 1961.

John J. Merwick, 63, Chicago, Ill., a veterinarian in the USDA for 37 years, died Feb. 4, 1961.

Emmet J. Packer (KCV '18), 73, Salem, Ore., died Jan. 27, 1961.

Dr. Packer was employed by the government as a poultry inspector in Salem. He was a former deputy veterinarian for the State of Missouri and was assigned to the Kansas City Stockyards before moving to Salem 7 years ago.

Charles F. Pinkham (KCV '09), 80, Kansas City, Mo., died Sept. 14, 1960.

After graduating from veterinary college, Dr. Pinkham practiced in Solomon, Kan., until 1914 when he joined the meat inspection service of the U.S. Bureau of Animal Industry, serving at Chicago, Leavenworth, Topeka, and Kansas City. He retired in 1945.

Dr. Pinkham was a member of the Kansas V.M.A.

Arthur E. Potter, 90, of Los Molinos, Calif., died Dec. 7, 1960.

Doctor Potter had practiced as a veterinarian for 25 years in Los Angeles.

David Richardson (MCK '18), 65, El Dorado, Kan., died Feb. 2, 1961.

Dr. Richardson had operated a small animal hospital in El Dorado for 31 years. During World War I he served in the armed forces as a meat inspector. He practiced in Arkansas and Texas before moving to Kansas.

★**Ernest D. Sadler** (CVC '09), 73, Wagner, S.D., died Feb. 23, 1961, while visiting a son in Los Angeles.

Dr. Sadler was a general practitioner.

★**Professor Alex V. Sahlstedt**, of the Royal Veterinary College of Stockholm, Sweden, and an honorary member of the AVMA since 1948, died in 1960.

Thomas V. Simpson (ONT '96), 89, of Yorktown, Sask., died Oct. 16, 1960.

Verner J. Smith (MCK '10), 85, Benton, Ark., died Feb. 1, 1961.

Dr. Smith had practiced in Eldora, Ark., Eagle River, Wis., and Union, Ark., before retiring in 1953.

Wallace F. Vail (NYA '06), 82, Greenwich, Conn., died Dec. 13, 1960.

Dr. Vail had maintained a veterinary hospital in Riverside, Conn., for many years.

William E. Williams (KCV '17), 70, Beloit, Kan., died Oct. 9, 1960, following a heart attack.

Dr. Williams had practiced in Colorado and Texas. He had lived in Durango, Colo., about 25 years. He had retired about 5 years ago.

R. F. Wright (USC '08), 80, of Highmore, S.D., died Nov. 26, 1960.

Dr. Wright had practiced for 15 years at Wessington Springs and Faith, S.D., before moving to Highmore in 1923. He had maintained a ranch and practiced veterinary medicine in Highmore since that time.

Women's Auxiliary

Modern Auxiliaries Need Modern Constitutions

Has the constitution and bylaws of your state auxiliary been rewritten or brought up-to-date recently? With the fast pace in which we live, time has thrust changes upon all organizations. Some governing documents are outdated, and if attempts have been made to bring them up-to-date, they can well resemble old patchwork quilts.

Many auxiliaries were originally organized to fill the need of a loosely knit group to plan entertainment for women who accompanied their husbands to state meetings. Their main objective was to promote friendship among the wives of veterinarians.

As auxiliaries grew, the need for working organizations grew. Local, regional, and state groups were soon working toward the establishment of loan funds to aid veterinary students, the contribution of scientific books to veterinary school libraries, and the promotion of the research fund of the AVMA, which financially assists graduate research students performing basic research. Auxiliary members have also worked to tell the public about the vital role veterinarians play in safeguarding public health. The promotion of friendship is still encouraged, but it is no longer the auxiliaries' chief reason for existence.

Along with added responsibility came more work for auxiliary officers and even a need for additional offices. For example, the secretaries or treasurers no longer collect dues. Keeping pace with the times, membership secretaries collect both state and national dues and encourage the promotion of new members. At the request of the AVMA, the Women's Auxiliary to the AVMA has set up an office for public relations with a vice-president in charge. Each state auxiliary has been encouraged to add a public relations officer to its board. All of these changes from the original auxiliary plan have required changes in auxiliaries' constitution and bylaws.

Another change that appears on most state auxiliary bylaws was brought about by a change in the bylaws of the national auxiliary. This change increased the number of delegates to the national House of Delegates. To accommodate it, some states have the constituent groups within their organization each select one delegate. Rotation from these groups is applied if state membership is not large enough to allow one from each group to attend the national session. Other states prefer to have the president appoint the delegation.

A new era has begun, and with it has come revisions of constitutions. In some cases, completely new documents are sorely needed to care for the changes time has wrought.

s/Mrs. John Stevens, *Parliamentarian*,
Women's Auxiliary to the AVMA

Oklahoma

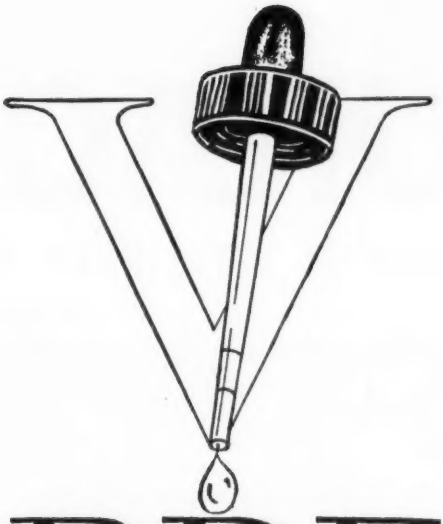
Women's Auxiliary Meets.—The Women's Auxiliary to the Oklahoma V.M.A. voted at its annual meeting in Stillwater, Jan. 22-24, 1961, to contribute $40 to the AVMA Student Loan Fund, $10 to the AVMA Research Fund, and $50 toward the expenses of the student delegate from Oklahoma to the Women's Auxiliary of the AVMA convention in Detroit next August.

Officers elected at the meeting are: Mrs. Hugh H. Harsteter, Cushing, president; Mrs. H. K. Henderson, Stigler, president-elect; Mrs. Fred Hutton, Tulsa, first vice-president; Mrs. Culver Moe, Oklahoma City, second vice-president; and Mrs. J. B. Corcoran, Stillwater, secretary-treasurer.

The 16 wives of senior veterinary students at Oklahoma State University were guests of honor at the meeting. Total attendance was 69.

Washington

Seattle Women's Auxiliary Elects New Officers.—New officers of the Women's Auxiliary to the Seattle V.M.A. are: Mrs. E. D. Montgomery, president; Mrs. S. B. Coe, president-elect; Mrs. R. D. Boyce, treasurer; and Mrs. Frank Fall, secretary.



ABDEC®

DROPS

A MULTIPLE-VITAMIN PRODUCT

contains important vitamins for daily administration to small animals. ABDEC DROPS may be used as supportive treatment in debility, convalescence, and during pregnancy and lactation.

Each 0.6 c.c. represents:

Vitamin A	5,000 units
Vitamin D	1,000 units
Vitamin B_1 (Thiamine Hydrochloride)	1 mg.
Vitamin B_2 (G) (Riboflavin)	1.2 mg.
Vitamin B_6 (Pyridoxine Hydrochloride)	1 mg.
Pantothenic Acid (as the sodium salt)	5 mg.
Nicotinamide	10 mg.
Vitamin C (Ascorbic Acid)	50 mg.

PARKE-DAVIS

PARKE, DAVIS & COMPANY
DETROIT 32, MICHIGAN

PARKE, DAVIS & COMPANY, LTD.
MONTREAL 9, QUEBEC

133-261-R

FURACIN®

TOPICALLY IN VETERINARY MEDICINE

IN SURFACE INFECTIONS FURACIN Dressing Veterinary —FURACIN (brand of nitrofurazone) 0.2% dissolved in a water-soluble base of ointment-like consistency

FURACIN Dressing Veterinary with Anesthetic—a water-soluble ointment containing FURACIN 0.2% with butacaine 0.5%.

FURACIN Solution Veterinary—water-miscible liquid of FURACIN 0.2% in polyethylene glycol and water. Valuable in bovine mastitis and impaired fertility.

IN BOVINE MASTITIS FURACIN Solution Veterinary SQUEEJET®—*new*, single-dose, disposable unit of 30 cc. FURACIN 0.2% in polyethylene glycol and water. Especially adapted for use in impaired fertility.

FURACIN-penicillin GEL Veterinary—a crystalline suspension of FURACIN 2% and 13,333 units per cc. of procaine penicillin G in peanut oil with 3% aluminum monostearate.

IN EYE INFECTIONS FURACIN Soluble Powder Veterinary —a soft, water-soluble powder containing FURACIN 0.2% in polyethylene glycol.

IN EAR INFECTIONS FURAGIN Ear Solution Veterinary —an anhydrous hygroscopic, water-soluble liquid composed of FURACIN 0.2% and polyethylene glycol.

IN GENITAL TRACT INFECTIONS FURACIN Suppositories Veterinary—a water-soluble base suppository, containing FURACIN 0.4%; melts at body temperature. Suitable for use in bovine retained placenta.

FURACIN Solution Veterinary—water-miscible liquid of 0.2% FURACIN in polyethylene glycol and water.

IN RETAINED PLACENTA FUREA® Veterinary – a bolus containing 0.12 grams of FURACIN to control infection and 12 grams urea to exert a proteolytic effect on necrotic tissue.

NITROFURANS—a *unique* class of antimicrobials—neither antibiotics nor sulfonamides

EATON LABORATORIES, NORWICH, NEW YORK

WHAT IS YOUR Diagnosis?

Make your diagnosis from the picture below—then turn the page

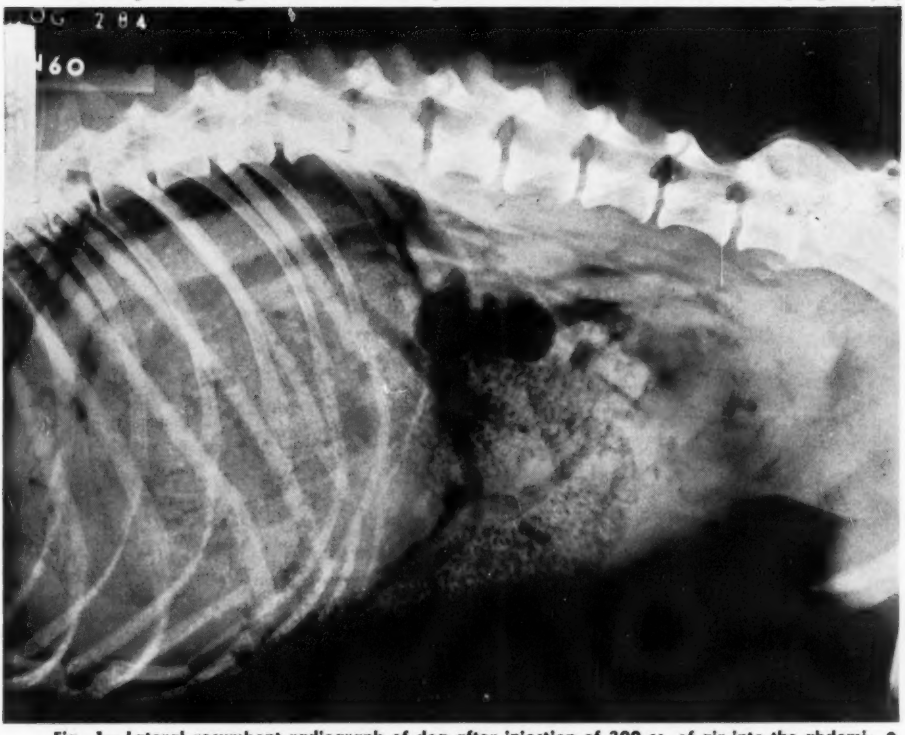


Fig. 1—Lateral recumbent radiograph of dog after injection of 300 cc. of air into the abdominal cavity.

History.—A male Boxer, 6 years old, was anesthetized with sodium pentobarbital prior to pneumoperitoneum and radiography of the abdomen. He was placed on his right side with the front- and hindlegs extended. A right lateral abdominal radiograph was then taken. Then an 18-gauge, 1¼-inch needle was inserted into the abdominal cavity slightly to the left of the midline and about 15 cm. posterior to the xiphoid cartilage. With a 50-cc. glass syringe, 300 cc. of air was injected. While a second radiograph (fig. 1), was being taken, the dog died.

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Generalized air emboli due to injection of the spleen with air (fig. 2).

Comment.—This case was handled as a clinical exercise to explore the dangers of pneumoperitoneum. The radiograph (fig. 1, 2), taken after air had been purposely injected into the spleen, is an unusual one but the problem it represents may not be. Pneumoperitoneum is an accepted and useful technique in radiography but it is not done without risk; there is danger of piercing and inflating abdominal organs, especially the spleen. Barbiturates markedly dilate the spleen by relaxing the smooth muscles, and both splenomegaly and splenomas are frequent findings in dogs after middle age. Furthermore, obesity and the possibility of distention and displacement of other organs also increase the hazards of peritoneal injection.

(Continued on adv. p. 34)

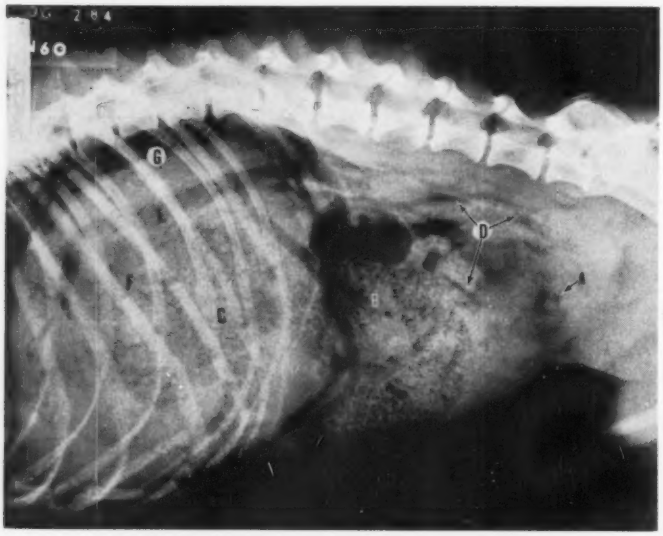


Fig. 2—Lateral recumbent radiograph of dog after injection of 300 cc. of air into the abdominal cavity: absence of pneumoperitoneum (A), and air emboli in spleen (B), liver (C), mesenteric vessels (D), portal vein (E), hepatic veins (F), and vena cava (G).

Fig. 3—Cross section of spleen after fixation in 10 per cent formalin solution. Notice the hemorrhage and circular air spaces (A).

MASS MEDICATION IN ITS MOST LOGICAL FORM

FURACIN®

BRAND OF NITROFURAZONE

WATER MIX VETERINARY

convenient · palatable · economical

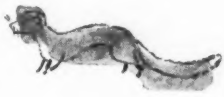
---

in necrotic enteritis (S. choleraesuis) of swine

FURACIN WATER MIX affords a swift, effective means of suppressing and preventing those serious herd outbreaks of infectious necrotic enteritis of swine. Since scouring pigs "off feed" often continue to drink, "Medication through the drinking water appears to be the method of choice when large numbers of pigs are involved. . . . FURACIN WATER MIX is well adapted to this kind of medication."[1] In this same study, results of bacterial sensitivity testing revealed, ". . . FURACIN was the most consistently effective drug against the various strains of E. coli, and against S. choleraesuis (necrotic enteritis)."[1]

in gray droppings of mink

Symptomatic improvement usually occurred within one week with FURACIN WATER MIX. "After 5 weeks' medication, 100% of the mink had normal feces."[2] "At pelting time, the medicated mink showed good flesh, large size, and bore a good quality pelt, while the untreated controls, showed signs characteristic of gray diarrhea: dehydration, lack of body fat, small body size, and poor fur quality."[3]



in cecal coccidiosis of poultry

"a valuable agent in preventing or reducing mortality . . ."[4] due to Eimeria tenella

in intestinal coccidiosis of poultry

". . . FURACIN was effective in preventing mortality due to initial infections with E. necatrix. . . ."[5]

SUPPLIED: Carton of 330 Gm. and the new carton of 25 pounds. Available from your professional veterinary distributor.

REFERENCES: 1. Roe, C. K.: Enteric Infections in Weaned Pigs. Paper presented at the Second Regional Conference on the Nitrofurans in Veterinary Medicine, Madison, Wisconsin, May 28, 1959, p. 10. 2. Hughes, D. L., and McMinn, Jr., C. S.: Furacin—A Control for Gray Droppings. Am. Fur Breeder 32:24 (Aug.) 1959. 3. Palarski, J. D.: Furacin Treatment of Gray Diarrhea in Mink. J. Am. Vet. M. Ass. 136:177 (Feb. 15) 1960. 4. Johnson, C. A.: Studies on the Efficacy of Soluble Furacin Against Cecal Coccidiosis. Abstracts of papers presented at the 45th Annual Meeting of the Poultry Science Association, Raleigh, N. C., Aug. 7-10, 1956, p. 21. 5. Shumard, R. F.: The Activity of Soluble Furacin Against the Coccidian, Eimeria necatrix. Paper presented at the First National Symposium on Nitrofurans in Agriculture, Michigan State University, East Lansing, Michigan, Sept. 28-29, 1956.

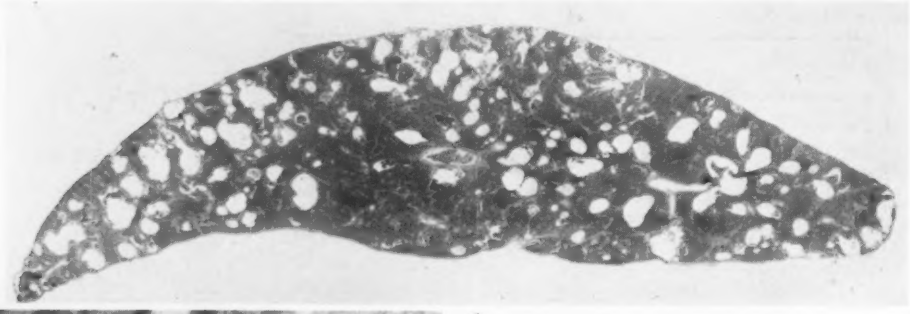
NITROFURANS—a unique class of antimicrobials—
neither antibiotics nor sulfonamides

EATON LABORATORIES
Division of The Norwich Pharmacal Company
NORWICH, NEW YORK

Here Is the Diagnosis—*continued*

At necropsy, 150 cc. of blood was found in the peritoneal cavity. It had escaped from the needle hole in the splenic capsule. The spleen was large and crepitant, and it floated when placed in the formalin fixative. When fixed, the cut surface was hemorrhagic and a great number of circular air spaces occupied by the air emboli were visible (fig. 3). Histologically, the splenic architecture was destroyed, leaving only a few trabeculae, vessels, hemorrhage, and the circular areas of the air emboli (fig. 4). The mesenteric veins were distended with air emboli (fig. 5) and when the right auricle of the heart was opened under water, 2 or 3 large bubbles of air came up through the water. Air emboli were also seen in the peripheral vessels of the cerebrum of the brain (fig. 6).

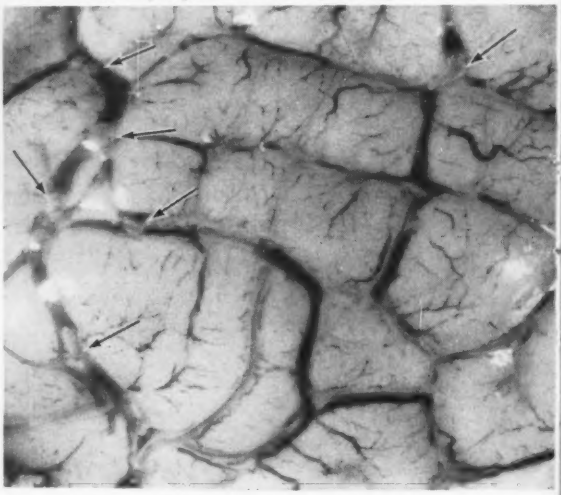
This report illustrates one possible hazard in performing pneumoperitoneum. The technique, a useful one, should be employed with caution and with an understanding of the possible locations of the organs that may be injured. Application of negative pressure on the syringe before injection will minimize such occurrences.



▲ Fig. 4—Air spaces, hemorrhage, and absence of architecture can be seen in this histologic preparation of a cross section of the spleen. x 4.

◀ Fig. 5—Air emboli in the vein (arrow) are evident in this photograph of mesenteric veins.

Fig. 6—Photograph of cerebrum showing air emboli in peripheral vessels (arrows). ▼



VACCINES ARRIVE SAME DAY!

Got a shipment going hundreds of miles? Get it out by 9 A.M.... it arrives the same day! Got a shipment going about 50 miles? Ship it out around 9 A.M.... it's there by noon!

Whatever the destination of your shipment, chances are, a Greyhound is going there anyway... *right to the center of town.* Greyhound travels *over a million miles a day!* No other public transportation goes to so many places—so often.

You can ship anytime. Your packages go on regular Greyhound passenger buses. Greyhound Package Express operates twenty-four hours a day... seven days a week... *including weekends and holidays.* What's more, you can send C.O.D., Collect, Prepaid ...or open a charge account.

CALL YOUR LOCAL GREYHOUND BUS TERMINAL TODAY...OR MAIL THIS CONVENIENT COUPON TO:

GREYHOUND PACKAGE EXPRESS
Dept. D-24 140 S. Dearborn St., Chicago 3, Illinois

Gentlemen: Please send us complete information on Greyhound Package Express service... including rates and routes. We understand that our company assumes no cost or obligation.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____ PHONE _____

CITY _____ ZONE ____ STATE _____

IT'S THERE IN HOURS...AND COSTS YOU LESS!

with Pard Balanced Protein Variety

WHEN you not only love dogs, but they are your livelihood, too—their health is of the utmost importance.

We at Swift know that, because we share the same affection and responsibility for dogs. Swift Research Veterinarians and Nutritionists have made the nutrition of dogs their life work. Whenever you feed or recommend any Pard product, you can have the same confidence you have in the care you yourself give to dogs.

Beef, and beef by-products are the source of animal protein in Pard, and beef, of course, is synonymous with good protein quality. In addition, both regular Pard and Pard with Beef Gravy contain soy grits, cereals, vitamins and minerals to supply —in just the proper ratio—*all* the nutrients dogs need. In Pard Crunchers, the high protein meat meal is also supplemented with milk, fish, soy, and cereal by-products—to give the same high nutritional value as the canned Pards.

"Beef up" your dog diets with Pard and be sure of the balanced protein variety so essential for good dog health, growth and reproduction.

LIKE YOU . . . SWIFT RESEARCH VETERINARIANS ARE DEDICATED TO THE HEALTH AND HAPPINESS OF DOGS

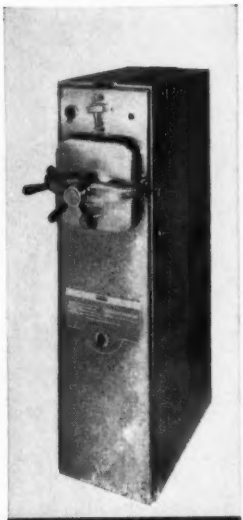
PARD CRUNCHERS with Beef Gravy
Economy in 20- and 50-lb. bags and smaller sizes. Mixes quickly and cleanly.

Swift
105TH YEAR
To Serve Your Profession Better

NOW two kinds of Pard in cans
Variety—alternate regular Pard and new Pard with Beef Gravy.

Use and recommend PARD products with confidence.

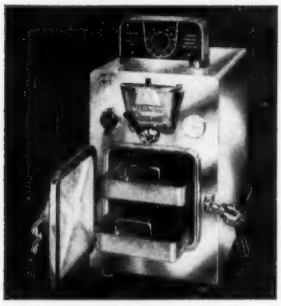
The 613-R Dynaclave
Low-cost, high-speed autoclave — portable automatic — efficient



The 1022 Aristocrat Autoclave
Office pressure steam sterilization to hospital standards and convenience

EVERY VETERINARIAN

CAN NOW HAVE THE BENEFITS OF PRESSURE STEAM STERILIZATION



The all-purpose 8816 Autoclave
Designed to meet exacting surgical sterilization standards — Cyclomatic Timer

There is an Amsco Office Autoclave to fit your needs and your checkbook.

Whether you are in private practice, research or in both, you need the protection offered by pressure steam sterilization of instruments, syringes, utensils, rubber gloves and related articles. This positive protection of your cases and yourself against cross contamination, is a comforting and practical safeguard.

These desirable benefits are economically yours with Amsco's balanced combination of advanced equipment, sound techniques and specialized services. Write for details today . . . attach the coupon to your letterhead and mail to American Sterilizer Company, Erie, Pa.

AMERICAN STERILIZER
ERIE • PENNSYLVANIA

Branch Offices and Service Centers in . . .
Atlanta, Boston, Chicago, Cincinnati, Dallas, Denver, Detroit, Los Angeles, New Orleans, New York City, Philadelphia, Pittsburgh, Richmond, St. Louis, St. Paul, San Francisco, Seattle, Tampa, Washington, D. C., including a dispersed Amsco Serviceman located near YOU for prompt service.

I am interested in Amsco Autoclaves for Veterinary applications:

Name _____

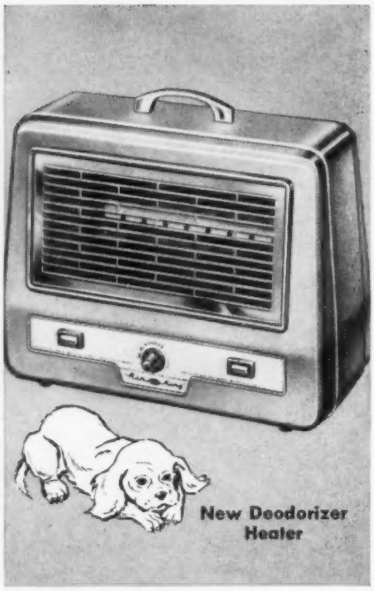
Address _____

City _____ Zone _____ State _____

Mail to American Sterilizer Company, Erie, Pa.

GET MODERN PROFESSIONAL EQUIPMENT

FREE OR AT A BIG SAVING!



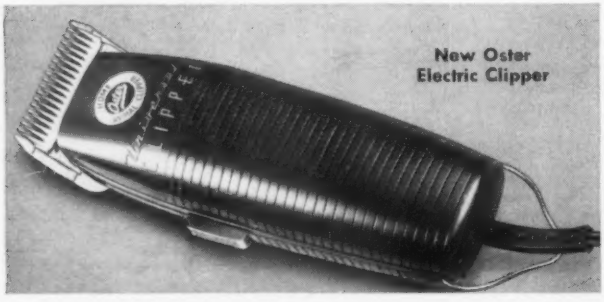
The more Ken-L-Biskit you buy... the more you save with the

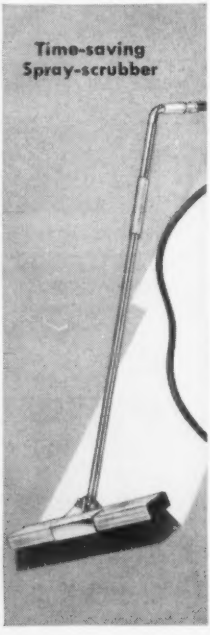
NEW KEN-L-BISKIT PREMIUM PLAN

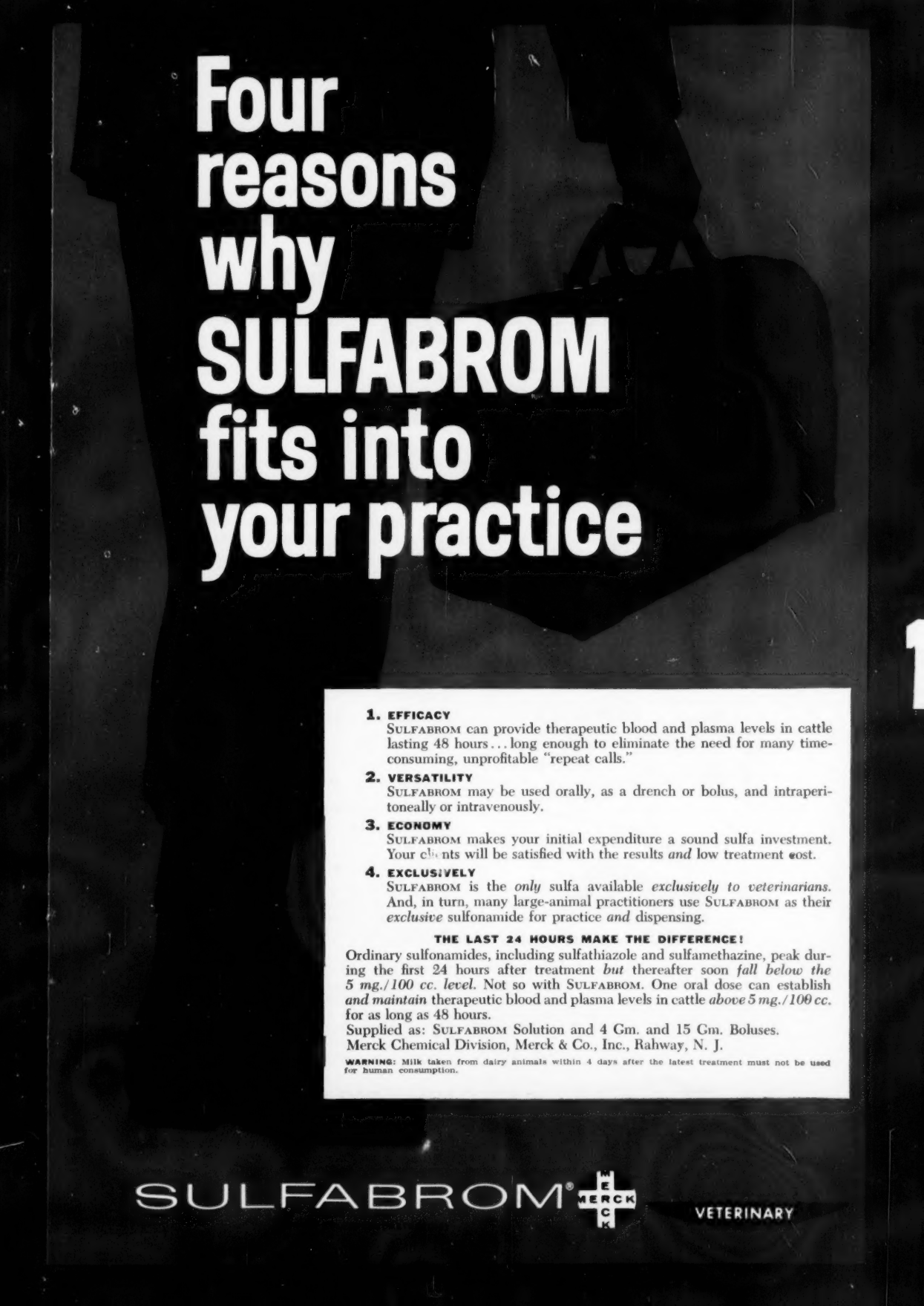
You can save most or *all* of the cost of fine-quality kennel necessities. And you can own the newest "efficiency" equipment for just a fraction of retail prices. These conveniences in your kennel or veterinary hospital will save you time and work. The more stamps you add up by buying Ken-L-Biskit, the less cash you pay. By adding up enough stamps, you can get any item free.

ECONOMICAL NUTRITION! Ken-L-Biskit is a complete diet with more nutrition per cup than most dry foods. You can feed less because it does *more*.

See the back of the Ken-L-Biskit 25- and 50-lb. sacks and find out about all 8 premiums and how you can get them at big savings.







1. **EFFICACY**
   SULFABROM can provide therapeutic blood and plasma levels in cattle lasting 48 hours... long enough to eliminate the need for many time-consuming, unprofitable "repeat calls."
2. **VERSATILITY**
   SULFABROM may be used orally, as a drench or bolus, and intraperitoneally or intravenously.
3. **ECONOMY**
   SULFABROM makes your initial expenditure a sound sulfa investment. Your clients will be satisfied with the results *and* low treatment cost.
4. **EXCLUSIVELY**
   SULFABROM is the *only* sulfa available *exclusively to veterinarians.* And, in turn, many large-animal practitioners use SULFABROM as their *exclusive* sulfonamide for practice *and* dispensing.

THE LAST 24 HOURS MAKE THE DIFFERENCE!

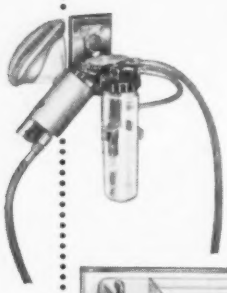
Ordinary sulfonamides, including sulfathiazole and sulfamethazine, peak during the first 24 hours after treatment *but* thereafter soon *fall below the 5 mg./100 cc. level.* Not so with SULFABROM. One oral dose can establish *and maintain* therapeutic blood and plasma levels in cattle *above 5 mg./100 cc.* for as long as 48 hours.

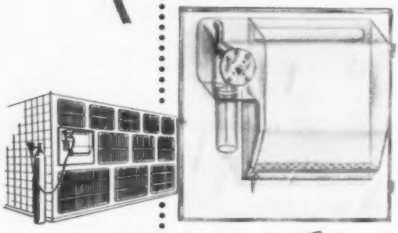
Supplied as: SULFABROM Solution and 4 Gm. and 15 Gm. Boluses.
Merck Chemical Division, Merck & Co., Inc., Rahway, N. J.

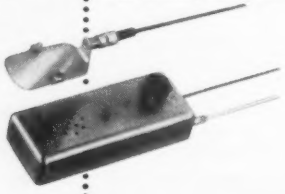
WARNING: Milk taken from dairy animals within 4 days after the latest treatment must not be used for human consumption.

SULFABROM® MERCK VETERINARY

Dealers! ....Veterinarians need....







A.V.R. (Anesthetizer-Vaporizer-Resuscitator)

. . . simple to operate, accurate—automatically maintains a constant level of inhalation type anesthesia and controlled respiration.

Handy* Resuscitator

. . . for successful treatment of respiratory and cardiac failure or surgical shock.

*Trademark

Oxygen Therapy Panel

. . . converts cage to an Oxygen Tent quickly and efficiently.

Veling Heart Monitor

. . . warns of cardiac emergencies—gives audible beat-to-beat signals.

ADDITIONAL EQUIPMENT AND ACCESSORIES . . .

Portable Suction Units	Therapy Masks
Emergency Oxygen Units	Regulators, Cylinder
Humidifiers, Nebulizers	Carriers . . .

The only complete source of Oxygen Therapy Apparatus for veterinary use.

More and more, NCG Oxygen Therapy, Resuscitation and Anesthesia Apparatus is being purchased by veterinarians. This equipment is being exhibited and demonstrated at many local and National Veterinary meetings by NCG representatives. And, as a result of its performance in clinical use, it has earned their acceptance. For more information, write today for Bulletin NM-140.000-M-6-22D. NATIONAL CYLINDER GAS DIVISION OF CHEMETRON CORPORATION, 840 N. Michigan Ave., Chicago 11, Illinois.

NCG®

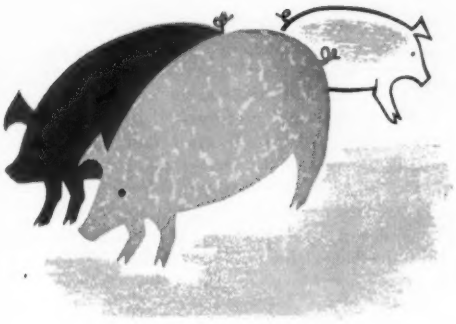
NATIONAL CYLINDER GAS

Division of CHEMETRON Corporation

© 1961, CHEMETRON CORPORATION

new product report #0105

for the prevention of swine erysipelas . . .



ERYSIPELAS BACTERIN

Ery·Jex

CONCENTRATED

in a new 2-cc. dose easy to administer . . . with less inoculation reaction

better products through research

Ery-Jex is the same fine erysipelas preventive as before . . . but now concentrated for ease of administration and reduced reaction from inoculation. New methods of concentration enable one 2-cc. dose of Ery-Jex to provide a high degree of immunity within 14 to 21 days; protects pigs all the way to market. Inject Ery-Jex subcutaneously; duration of immunity is approximately one year. Available in 20 and 100-cc. vials . . .

with sales to graduate veterinarians only.

Research Laboratories, Inc., Saint Joseph, Missouri

J. F. Smithcors, D.V.M., Ph.D.

History of the AVMA

1908

In this presidential address at the meeting in Philadelphia, W. H. Dalrymple called attention to the fact that the American Medical Association was urging "rational reciprocity" based upon uniform standards of education and legislation among the states. Dr. Dalrymple observes, "The trend of professional opinion, both medical and veterinary medical, I think, seems evidently to be in this direction of reciprocity among the states; and which, I believe, is a prospective condition, concerning our profession, worthy of the best thought of this association. If I mistake not, one of the first steps in the accomplishment of this end, would be uniformity in the educational requirements.

The report of the Committee on Education evoked much discussion. It dealt mainly with criticisms of the report issued by the USDA, which recommended certain minimum standards for matriculation and graduation, modified from a similar report made by the committee, but which had failed to obtain the approval of the Association.

While it was recognized that some action had to be taken with regard to some of the schools with lesser requirements, the committee objected to the rigid curricular requirements and educational standards for teachers imposed upon the schools. "This recommendation shows complete disregard for sound principles of teaching . . . . To say that a professor of anatomy must give at least 200 lectures and 300 hours of laboratory work is to interfere with a detail of pedagogy with regard to which the Secretary of Agriculture *has positively no right* to interfere . . . . Anatomy is a subject difficult to teach by lectures.

In rebuttal, Tait Butler, a member of the USDA committee, was of the opinion that " . . . . the Committee was as competent to say how anatomy should be taught as Dr. Pearson is to judge of the competency of the Committee . . . . If it is within the province of the Secretary of Agriculture to say that anatomy shall be taught his employees, then it is within his province to say how it shall be taught and how much shall be taught."

By unanimous consent it was resolved that the AVMA ". . . extend the privilege of membership to veterinarians of the new world, and that veterinary associations in other countries of North, Central and South America be invited to send representatives to our annual meetings."

John G. Rutherford, AVMA President from 1908-1909.

JOHN GUNION RUTHERFORD was born in Scotland, Dec. 25, 1857, and came to Canada in 1875. He was graduated first in his class from the Ontario Veterinary College in 1879, following which he practiced at various places in the United States, Mexico, and Canada. In 1884 he moved to Manitoba and became Veterinary Inspector for the province until 1892, when he resigned to enter politics. In 1902 he was appointed Chief Veterinary Inspector and in 1904, Veterinary Director General for the Dominion. It was primarily through his efforts that the Ontario school was made a provincial institution affiliated with the University of Toronto, which conferred upon him the degree of Doctor of Veterinary Science in 1920.

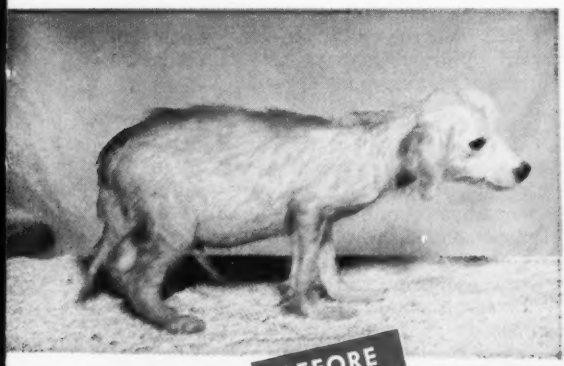
Dr. Rutherford joined the AVMA in 1902, was 5 times elected a vice-president, and was elected president in 1908. This same year he was honored by being the first American graduate elected as an Honorary Associate of the Royal College of Veterinary Surgeons. Death came after a protracted illness, at Ottawa, July 24, 1923.

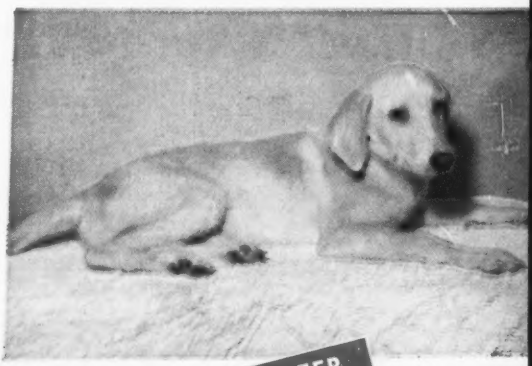
THERA-TERGENT

a truly therapeutic shampoo

for fungal, bacterial, and allergic

dermatoses of dogs and cats





THERA-TERGENT is a new, effective and clinically proven[1] dermatologic shampoo. Its drug elements are synthesized to achieve uniquely deep dermal penetration — destroy bacteria and fungi, ***both*** on and within the skin. Its concentrated* shampoo base, of unusual detergent action, cleanses hair and skin thoroughly, at the same time helps replace lost skin oils — soothes the integument, allays pruritus, promotes healing.

And safe! THERA-TERGENT may be used without special protection of eyes or genitalia of the animal — is completely safe for use on cats. It is nonstaining, leaves the animal pleasantly scented. It will not irritate skin, eyes, nose, or respiratory tract of the user. Contains 6% Triethanolamine Thiocyanate Warren-Teed.

1. "Clinical Evaluation of a Drug for Dermatoses of Dogs and Cats," Wenger, J. B., Vet. Med., 55:55-58, Mar. 1960.

* Treats more animals per bottle.

SUPPLIED: 5¾ oz. and 1 gal. amber plastic bottles

THE WARREN-TEED PRODUCTS COMPANY

Veterinary Medical Division

Dallas **Chattanooga** **COLUMBUS, OHIO** **Los Angeles** **Portland**

WARREN-TEED PHARMACEUTICALS

Public Relations

Public Information

PR Round Table to Appraise Veterinary Public Relations

The AVMA has invited all secretaries of constituent associations to send their public relations representatives to a Public Relations Round Table to be held in Chicago, May 20 and 21.

The invitation stated that the AVMA was calling the meeting to discuss the profession's over-all public relations program and to appraise the means through which the AVMA and its constituent associations can jointly achieve the objectives of veterinary public relations.

The National View

On the national level, the AVMA's director of public information recently reviewed the Association's public relations program for the Executive Board. The review established the framework for the AVMA's public relations program, indicated its objectives, and outlined the methods through which these objectives can best be achieved.

Appraising, among other PR requirements, the urgent need for systematic release of information about veterinary medicine to the public through the press and other influential mediums, the review stated in part: "In the past, the public relations activities of the AVMA have emphasized and publicized the profession's role in the health care of small animals and livestock to such a degree that insufficient attention was given to other vital areas in veterinary medicine. These area include the activities of veterinarians in public health; in nutritional, medical, and agricultural research; in the pharmaceutical industry; and in state and federal governmental projects. Consequently, neither the public nor allied professions know much, if anything, about these facets of veterinary medicine. These areas must not only be included in the AVMA's public and professional relations programs but, on occasion, emphasized."

About the AVMA's relations with radio, television, and national magazines, the review said: "Establishment of magazine, television, and radio relations should be considered long-range projects in the AVMA's public relations program. Initially, both national communications mediums and science writers will be exposed to the affairs of veterinary medicine by means of news releases issued regularly. It is hoped that the director of public information will have an early opportunity to visit with editorial personnel of national communications mediums in New York. The purpose of such a visit would be to discuss future cooperation between the AVMA and the mediums with a view toward jointly developing articles and programs of interest to the lay public."

The Membership View

However, the public relations activities of a national health organization, while requiring guidance from the national level, are a cooperative venture that depend on the support and cooperation of all groups and segments of the profession. Their knowledge of the profession and their experience with the various publics they serve can make an important contribution to the Association's over-all public relations program.

Their knowledge and experience also largely determine their views of the objectives and methods of veterinary public relations. Which aspects of veterinary medicine should be stressed? Which public relations methods should have priority? Which kind of program will best serve all members of the profession?

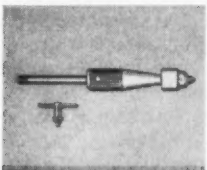
A random sampling of recent letters to the AVMA's director of public information and of articles and editorials in veterinary periodicals reveals almost as many different views on this matter as there are writers. Some practitioners urge the preparation of more PR material such as speech kits, newspaper articles, or publicity manuals for local and state associations. Others suggest multi-page advertisements in national magazines as the most effective means of informing the public about the profession. Many practitioners feel that the AVMA's public relations efforts should concentrate on the recruitment of talented young people to the ranks of veterinary medicine.

These are legitimate views, advanced by veterinarians deeply concerned about the public image of their profession. How to translate these views into meaningful and effective action is the question to which the Chicago Public Relations Round Table hopes to provide an answer.

H. R. KUEHN
Director, Public Information

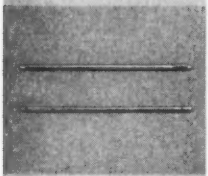
Kirschner

YOUR FRACTURE EQUIPMENT HOUSE



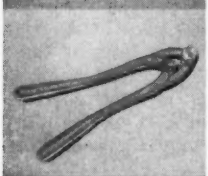
pin drill

A precision made instrument for accurate placement of intramedullary and external fixation pins.



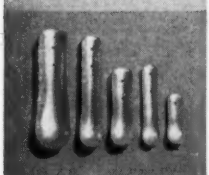
intramedullary pins

Made from the finest surgical stainless steel; three style points available in seven diameters.



pin cutter

A very rugged cutter designed especially to withstand the tremendous pressures required in the cutting of surgical stainless pins.

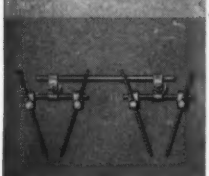


mason meta splints

A handy splint for immobilizing minor fractures and soft tissue injuries in the lower leg and paw.

thomas splints

Unique design allows for maximum flexibility in application. Available in five sizes.



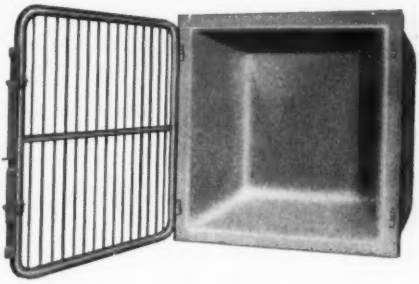
external fixation

The time proven method of reducing and immobilizing fractures under a closed reduction.

depend on Kirschner for your fracture equipment

Kirschner

HEADQUARTERS FOR THE ORIGINAL GLASS PLASTIC CAGE



The finest cage you can buy and at a remarkably low price.

Constructed from the finest quality fiberglass resin alloys, especially compounded for animal cages. Proven durability with lowest maintenance costs.

Molded, seamless construction throughout . . . glass smooth interiors . . . rounded corners for ease of cleaning . . . warm to the touch (unlike metal or masonry), your patients are comfortable and as a result, quieter.

You will be as proud of your cage wards as you are of your waiting room . . . your clients will be impressed with the sanitary and comfortable appearance of their pet's temporary home.

Send complete information regarding

☐ new catalog-technic booklet.
☐ glass-plastic cages.

_____
DVM

_____
STREET

_____
CITY

KIRSCHNER MFG. CO.
Vashon, Washington

TOURS AND SIGHTSEEING IN DETROIT

Motor City has a host of unusual sights which few of the world's cities can rival. You can make your attendance at the AVMA's 98th annual session a more memorable one by treating yourself for a few hours to the pace, the flavor, the sights, and smells of an exciting, bustling metropolis.

You can do your sightseeing in one of two ways: either pick a couple of the attractions listed below and strike out to see them on your own, or choose one of the Gray Line bus tours. Either way, the time and money you spend seeing the city of the annual session will be a good investment.

Auto Plant Tours

The lifeblood of Detroit is its automobile industry. The giant Ford Rouge plant is the most famous of the car-producing factories. All, however, are equally interesting. In most cases, visitors can see all the manufacturing steps involved in transforming a bare automobile frame into a finished product. Free tours lasting from one to two hours are scheduled Monday through Friday all year except during model change-over time. In addition to the Ford Rouge tour, which begins at the Rotunda, Dearborn, other plant tours are Cadillac Motor Car Co., 2860 Clark; DeSoto and Chrysler, 12200 E. Jefferson; Dodge, Dart, and Valiant, 7900 Jos. Campau, Hamtramck; Imperial, 8505 W. Warren, Dearborn; Plymouth, 6334 Lynch Road; and Pontiac, Glenwood and Kennett roads, Pontiac.

Above is part of the collection of more than 165 old automobiles in the Henry Ford Museum and Greenfield Village.

Henry Ford Museum and Greenfield Village are the most popular attractions in Detroit. The 30-year-old institutions are located in Dearborn, not far from the Ford Rouge plant. In Greenfield Village there are nearly 100 famous homes and workshops, transported from their original settings and reconstructed in this 200-acre area. Included in the 11-acre Ford Museum are fascinating collections of historic automobiles, locomotives, airplanes, agricultural implements, examples of American decorative arts, and a street of 22 Early American shops.

Attempting to tour both the museum and village in one day poses an almost impossible task. Both are open daily and rates for each are $1.25 for adults and $.50 for children under 12.

Civic Center

The Civic Center, a gleaming, $100,000,000 revitalization of Detroit's riverfront, is a symbol of the Detroit of the future. Mammoth Cobo Hall will be the site of AVMA's scientific exhibits and meetings. Other buildings completed are the City-County Building, Veterans' Memorial, and Ford Auditorium.

Belle Isle, Detroit's unique island park, has always been a favorite with Detroiters and out-of-towners alike. A leisurely trip around the island's 6-mile shore-skirting drive is guaranteed to charm even the most critical visitor.

This beautiful 1,000-acre park offers all forms of recreation including canoeing, boating, swimming, tennis, golf, and even listening to summer evening band concerts in the Remick Shell. The Scott Fountain, dazzling in the daytime, is entrancing at night when internal illumination transforms it into a shimmering thing of beauty. Picnic areas are plentiful.

Located here also is the Children's Zoo, a 2-acre gathering of exhibits done in a Mother Goose theme. Children can pet many of the animals. Admissions to the zoo, open May through September, is 10c. One of the world's outstanding fresh-water aquariums also is located here. There is no admission charge.

Detroit Zoological Park

The Zoological Park at 10 Mile Road near Woodward (US-10) in Royal Oak covers 122

beautifully landscaped acres and includes some 3,300 specimens of animals, birds, reptiles, and fish. The Zoo railroad takes patrons on a tour of the animal world, through an African swamp, Australian plains populated by kangaroos, and even to the polar regions. There is no admission charge.

The Detroit Historical Museum, on the west side of Woodward at Kirby, traces the growth of Detroit from a pioneer community to its current position as one of the country's chief industrial centers. Early Detroit streets have been reconstructed and the visitor can walk through the periods of the middle and late 1800's. The exhibits chiefly reflect the changing American standard of living. The museum is open every day except Monday. Admission is free.

The Children's Museum, at 67 E. Kirby, is especially designed for youngsters. There is no admission charge, and the museum is open every day except Sundays and holidays.

The new Dossin Great Lakes Museum is located on the Canadian side of Belle Isle. Every imaginable ship model is on view here, plus many original pieces of marine equipment used on Great Lakes ships. There are ship bells, anchors, wheeelhouses, even a periscope from the submarine, Tambor. No admission is charged. This museum is open Wednesday through Sunday, 1:00 to 7:00 p.m.

Above is Detroit's unique Children's Zoo where tame and baby animals live in Mother Goose settings and where young visitors are encouraged to feed the animals.

Ford Rotunda

Considered one of the showplaces of the auto industry, the Ford Rotunda contains a series of displays generally related to engineering and research. Animated dioramas add life to the displays. Films are shown continuously in the Rotunda auditorium.

Located at 3000 Schaefer Road, Dearborn, the Rotunda is open every day of the year except Saturdays. No admission is charged. Near the Rotunda is the glass-walled Ford Central Office Building, at Southfield and the American Road (Michigan Ave.)

The Fisher Building, in the Second Avenue-W. Grand Boulevard area, is regarded as one of the most beautiful office buildings in the world. Its matched marble corridors are noteworthy. Located in the New Center area, the building houses numerous businesses and exclusive shops as well as the Fisher Theater, noted for its unusual Mayan decor. The General Motors Building, one of the world's largest office structures, is opposite the Fisher Building. Visitors can see a pageant of GM products here. No admission is charged.

Sightseeing by Bus

The Gray Line Bus tours described below are designed to give you in 30- to 40-mile trips a combined view of Detroit's most arresting sights. The buses will pick you up at downtown hotels, at the Greyhound bus terminal, or at Grand Circus Park. Experienced guides point out places of interest along the way.

Tour 1, Ford Plant and Greenfield village. —For this tour of Detroit's industrial southwest side, the bus heads south along the Detroit River. You see the busy railroad yards, the Ambassador Bridge, and the 26-acre produce terminal. You go on a trip through the Ford Rouge factory and Greenfield Village. Heading back to Detroit, you ride along Michigan Avenue, the world's longest street, and see Briggs Stadium.

(Tour time: 4½ hours. Fare: $5.25. Pick-up at the Sheraton-Cadillac: 9:40 a.m.)

Tour 2, Bell Isle and Windsor, Canada.— Heading up-river, the bus takes you to the historic Mariners' Church, to the largest stove in the world, and to Belle Isle, the

city's 900-acre playground. Then you cross through the world's only international auto tunnel to Windsor, Canada, where you have time for a shopping trip. Returning over the Ambassador Bridge, 152 feet above the water, you can see ships from all over the globe.

(Tour time: 3 hours. Fare: $3.50. Pick-up at the Sheraton-Cadillac: 2:35 p.m.)

The following tours are available only to groups of 25 persons or more:

Tour 3, Cultural and Business Center.—Downtown Detroit, with its multimillion dollar civic center, welcomes you first on this exciting tour. Then you will drive past the world's largest Masonic temple, past modern Wayne State University to the huge General Motors building and the lofty Fisher building with its "Golden Tower." Circling the cultural area, you will see Detroit's famous Institute of Arts, the beautiful Main Library, and stop for a trip through the Historical Museum where exhibits trace Detroit back to its founding by the French in 1701.

(Tour Time: 2 hours. Fare: $1.70 per person. For more information contact the Gray Line Office, 200 Old City Hall, phone WO 2-9233 or WO 5-5907.)

Tour 4, Tours 2 and 3 Combined.—Detroit offers an immense spectacle of skyscrapers, expressways, factories, railroads, river docks, and warehouses. But around it are pleasant residential sections with brightly painted homes. Tour Four is designed to show you this Detroit. You will also see Windsor and other interesting places.

(Tour Time: 5 hours. Fare: $3.50 per person. For additional information contact the Gray Line Office, 200 Old City Hall, phone: WO 2-9233 or WO 5-5907.)

Childen's Fare: Children under 6 years, when not occupying a seat to the exclusion of another person, ride free. Children between 6 and 12 ride for half fare.

REGISTER IN ADVANCE

For the first time in many years, convention guests can register in advance and avoid delay in long registration lines at the convention site. As a result of a postconvention survey conducted among members at the Denver meeting, it seemed advisable to offer a preconvention registration system. On the facing page a preregistration form is printed. Members who wish may fill out this form and submit it to the AVMA with the payment of registration fees. The central office staff will then prepare all the necessary badges, tickets, and other materials into a convention kit which will be ready for the registrant when he arrives in Detroit. Requests for refund of registration fees from registrants who find it impossible to attend will be honored if received by August 7, 1961.

Other information on the convention city and its hotels appears on pages 54 and 55 in this issue.

Registration fees for the 98th Annual Meeting of the AVMA are:

Members, their wives and guests	$ 8.00 each
Children	3.00 each
Nonmembers, their wives and guests	15.00 each

AVOID THE CROWDS!

REGISTER IN ADVANCE!

You can avoid long waits and frustrating delays by registering in advance for attendance at

THE 98th ANNUAL MEETING OF THE AVMA
AUGUST 20-24, 1961
DETROIT, MICHIGAN

Simply fill in the form on this page and RETURN IT TO US along with your check for the correct amount. We will mail you a receipt. You need only present your receipt in Detroit and pick up your convention tickets and material. Mail your advance registration today!

REGISTRATION FEES
(Fees must be submitted with registration form)

AVMA members, their wives and guests	**$ 8.00 each**
Children	**$ 3.00 each**
Nonmembers, their wives and guests	**$15.00 each**
Alumni Dinner Tickets	**$ 5.00 each**

(Alumni Dinners will be held on Tuesday, August 22)

NOTE: Wives and children must be registered only if they will participate in women's, teens, or subteens' programs. Advance registration closes August 1, 1961. Refunds will be made only if request is received prior to August 7, 1961. Hotel reservations must be made by individual.

Cut on Dotted Line and Return to AVMA, 600 S. Michigan Ave., Chicago 5, Illinois

For ADVANCE REGISTRATION: 98th ANNUAL MEETING OF THE AVMA
August 20-24, Detroit, Michigan

Please register me and others named below in advance and furnish receipt. My check for $ _____ is enclosed.

Name (please print) _____

Complete Address _____

_____

Wife's Name _____

Guest's Name (s) _____ Children's names and ages

_____ _____

_____ _____

Number of Alumni Dinner Tickets _____ School _____

RETURN TO: AVMA, 600 S. Michigan Ave., Chicago 5, Ill.

Coming Meetings

Notices of coming meetings must be received 30 days before date of publication.

April, 1961

Ohio Academy of Science. Annual meeting. University of Cincinnati, Cincinnati, Ohio, April 20-22, 1961. Mr. Kenneth B. Hobbs, 505 King Ave., Columbus 1, Ohio, executive secretary.

Animal Health Institute. 21st annual meeting. Mayflower Hotel, Washington, D.C., April 24-26, 1961. Dr. Guy A. Railsback, Cutter Laboratories, 4th & Parker Sts., Berkeley 10, Calif., president.

Southwestern Conference on Diseases in Nature Transmissible to Man. Eleventh annual conference Agricultural and Mechanical College of Texas, Memorial Student Center, College Station, Texas, April 27-28, 1961. Dr. F. P. Jaggi, Jr., Department of Veterinary Public Health, Agricultural and Mechanical College of Texas, College Station, Texas, conference chairman.

May, 1961

Eastern Iowa Veterinary Medical Association. Clinic. Hawkeye Downs, Cedar Rapids, Iowa, May 9, 1961. Dr. Robert Goodwin, Newhall, Iowa, secretary.

June, 1961

Texas, Agricultural and Mechanical College. Fourteenth annual conference for veterinarians. School of Veterinary Medicine, Agricultural and Mechanical College of Texas, College Station, Texas, June 1-2, 1961. Dr. R. D. Turk, Texas Conference for Veterinarians, School of Veterinary Medicine, College Station, Texas, conference chairman.

Dr. George B. Belloff Receives Ciba Appointment

George B. Belloff (UP '50) has been appointed associate director of the Animal Health Research Division in charge of veterinary-agricultural research at Ciba Pharmaceutical Products Inc.

Prior to joining Ciba in 1956, he held the position of veterinarian in charge of animal health at the Schering Corporation, Bloomfield, N. J. He also served as assistant director of veterinary clinical research at Eaton Laboratories, Norwich, N. Y.

Dr. Belloff was formerly senior research veterinarian in Ciba's animal health division. His new duties will include initiation and supervision of clinical and field trials throughout the United States, and liaison with the FDA.

He is a member of the AVMA, the New Jersey V.M.A., the World Poultry Science Association, and American Society of Animal Production.

Kansas State University. Twenty-third annual conference for veterinarians, Little Theatre, Student Union Building, Kansas State University, Manhattan, Kan., June 11-13, 1961. Dr. John Noordsy, Dykstra Veterinary Hospital, Kansas State University, Manhattan, Kan., chairman.

Kansas Veterinary Medical Association. Semiannual business meeting. Student Union Building, Kansas State University, June 11-13, 1961. Dr. M. W. Osburn, 1525 Humboldt St., Manhattan, Kan., secretary-treasurer.

Pennsylvania Veterinary Medical Association. Annual meeting. Pennsylvania State University, University Park, Pa., June 13-15, 1961. Dr. Raymond C. Snyder, Walnut Street and Copley Road, Upper Darby, Pa., secretary.

South Carolina Veterinary Medical Association. Summer program. Columbia Hotel, Columbia, S.C., June 15-17, 1961. Dr. L. D. Rodgers, Greenwood Veterinary Hospital, Box 348, Greenwood, S.C., program chairman.

Georgia Veterinary Medical Association. Fifty-fifth annual convention. Jekyll Island, Ga., June 18-20, 1961. Dr. A. M. Mills, 325 Pinecrest Dr., Athens, Ga., secretary.

North Dakota State Veterinary Medical Association. Fifty-sixth annual meeting. Ray Hotel, Dickinson, N.D., June 18-20, 1961. Dr. C. B. Bjornson, North Dakota State University, Fargo, N.D., secretary-treasurer.

North Carolina Veterinary Medical Association. Sixtieth annual meeting. Morehead-Biltmore Hotel, Morehead City, N.C., June 19-21, 1961. Dr. J. T. Dixon, 3026 S. Main St., Winston-Salem, N.C., secretary.

Minnesota Veterinary Medical Association and South Central Minnesota Veterinary Medical Association. Summer clinic. Owatonna, Minn., June 21, 1961. Dr. Paul Cox, 1005 Mineral Springs Rd., Owatonna, Minn., general chairman.

Maritime Veterinary Associations. Twelfth annual joint conference. Mount Allison University, Sackville, N.B., June 27-29, 1961. Dr. R. McG. Archibald, P. O. Box 310, Sackville, N.B., Can.

Nebraska, University of. Swine Repopulation Conference. Veterinary Science Department, University of Nebraska, Lincoln, Neb., June 28-29, 1961. Dr. Crosby Howe, Department of Veterinary Science, University of Nebraska, Agricultural Experiment Station, Lincoln 3, Neb., chairman.

July, 1961

Mississippi-Louisiana Veterinary Medical Associations. Bi-state annual meeting. Buena Vista Hotel, Biloxi, Miss., July 2-4, 1961. Dr. J. W. Branson, Box 4223, Fondren Station, Jackson, Miss., secretary; or Dr. R. B. Lank, 246 Guava Dr., Baton Rouge, La., executive secretary.

Nebraska Veterinary Medical Association. Annual summer and clinical demonstration meeting. Town House, Omaha, Neb., July 10-12, 1961. Mr. Bob Garey, Hotel Clarke, Rooms 18-419, Hastings, Neb., executive secretary.

Kentucky Veterinary Medical Association. Fiftieth annual meeting. Sheraton Hotel, Louisville, Ky., July 17-18, 1961. Dr. L. S. Shirrell, 545 E. Main St., Frankfort, Ky., secretary.

Auburn University. Fifty-fourth annual conference for veterinarians. Auburn University, School of Veterinary Medicine, Auburn, Ala., July 23-26, 1961. Dr. J. E. Greene, dean.

August, 1961

American Association of Veterinary Bacteriologists. Annual meeting. Department of Microbiology and Public Health, College of Veterinary Medicine, Michigan State University, East Lansing, Mich., Aug. 18-19, 1961. C. H. Cunningham, Department of Microbiology and Public Health, College of Veterinary Medicine, Michigan State University, East Lansing, secretary.

American Veterinary Medical Association. Ninety-eighth annual meeting. Sheraton-Cadillac Hotel, Detroit, Mich., Aug. 20-24, 1961. Dr. H. E. Kingman, Jr., 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Foreign Meetings

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burgemeester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

Twelfth World's Poultry Congress. Show Grounds of the New South Wales Royal Agricultural Society, Sydney, Australia, Aug. 13-18, 1962. Dr. Cliff D. Carpenter, chairman, U.S. Participation Committee, 1207 Emerald Bay, Laguna Beach, Calif.; Dr. A. William Jasper, secretary, c/o AFBF, 2300 Merchandise Mart, Chicago 54, Ill.

Bears Sleep in Steam-Heated Den

A black bear and her 2 cubs are hibernating in a steam-heated den in Yellowstone National Park. Nestled in the upper rock layers of a hot spring formation the den is heated by fumes from an active hot pool just under the floor of the den. Another bubbling spring lies a short distance above the den.—*Science News Letter, Jan. 21, 1961.*

Mammalian Hibernation a Slow, Irregular Process

Animal hibernation is a slow process beginning with a short sleep, a period of waking, a longer sleep, waking again, and eventually the deep sleep usually thought of as "hibernation." One study of woodchucks showed that the transition from full activity to deep dormancy takes from 3 to 30 days. Some mammals, such as the skunk, hibernate only during the most severe weather and usually for less than a month. The black bear does not sleep as soundly or as long as the woodchuck, the chipmunk, and the raccoon, nor does its body temperature drop so low.

The phenomenon of hibernation remains a puzzle. Experts do know that cold, darkness, and quiet are important in bringing about hibernation. Individuals of the same species show wide variation in response to these factors and, when kept in a zoo, natural hibernators seldom if ever hibernate. Particular physiologic changes take place during hibernation. Body temperature drops drastically and breathing rate and heart beat become slow and irregular. The ground squirrel's spleen enlarges and the woodchuck's pituitary gland seems to become inactive.—*Sci. News Letter (Jan. 14, 1961): 32.*

You spent $450,000,000 on bowling last year

13½ times as much as you gave to fight cancer

Shocking? Yes. And here's another shocking fact: in 1961, cancer will strike in approximately two out of three homes.

Go bowling. It's fun. Enjoy yourself. But when you spend fifty cents to knock down pins—give as much to the American Cancer Society—*to knock out cancer.*

If you do that, you will be giving $450,000,000 to fight cancer this year. *Thirteen and a half times as much as last year!* Fight cancer with a checkup—and a check to the **American Cancer Society.**

For treating respiratory diseases

No other injectable offers all these advantages

Broad spectrum—effective against a wide range of organisms involved in respiratory diseases and associated secondary bacterial infections

Convenient—a concentrated, ready-to-use solution that can be administered intravenously, intramuscularly or subcutaneously

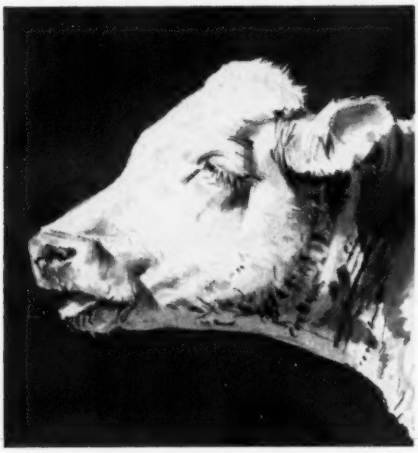
Rapidly absorbed from injection site

Highly stable—can be carried in bag or car without danger of freezing . . . requires no refrigeration

Liquamycin Injectable is a recommended addition to your drug inventory during the fall and winter months when the greatest incidence of respiratory diseases occur.

Wide range of antimicrobial activity is an advantage when treating the mixed bacterial infections* commonly encountered in respiratory cases under field conditions.

This preconstituted, ready-to-use solution form is rapidly absorbed from the injection site. Following the administration of 2 mg. per pound of body weight in cattle, the antibiotic blood serum level can be detected for at least 36 hours.



Economical. Costs no more to use than many products that are not as effective or convenient to use.

And this new, all-liquid form offers many conveniences of use.

• versatile—Liquamycin could be the only antibiotic in your bag. Yet you could enjoy the convenience of selecting the injection route that best serves your treatment purposes—intravenous, intramuscular or subcutaneous.

• no special handling problems—Liquamycin Injectable needs no refrigeration . . . no protection from freezing even at extremely low temperatures. And its highly stable form assures a long storage life.

• ready to use—no mixing needed.

Liquamycin Injectable is available in 500-cc. bottles containing 25 grams of oxytetracycline activity and in 50-cc. dispensing vials containing 2.5 grams oxytetracycline activity.

*due to oxytetracycline-susceptible organisms

Sold only to veterinarians

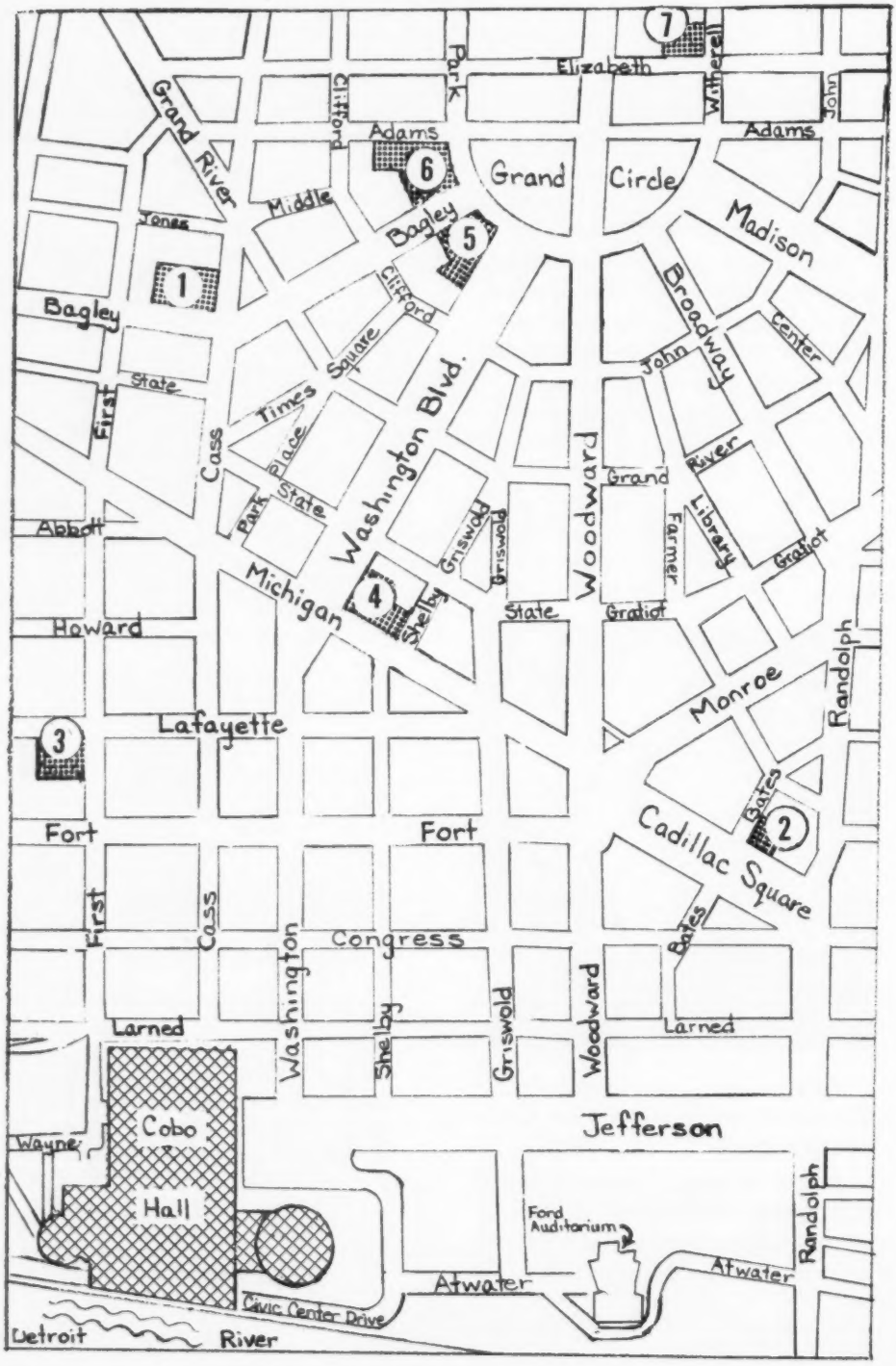
LIQUAMYCIN® INJECTABLE

BRAND OF OXYTETRACYCLINE HCl

Pfizer

Department of Veterinary Medicine
Chas. Pfizer & Co., Inc., New York, N. Y.
Science for the world's well-being™

Map of Downtown Detroit



ANNUAL MEETING HOTEL RESERVATION REQUEST

American Veterinary Medical Association

Detroit, Michigan - August 20-24, 1961

INSTRUCTIONS AND INFORMATION

Please give ALL of the information requested below and mail this form to the Detroit Convention and Tourist Bureau. All reservations must be cleared through the Housing Bureau.

Blocs of rooms have been allocated for our use in the hotels which are listed. The Housing Bureau must have the names of all the persons who will occupy each room. No bloc reservations will be made.

Placement will be made in the order received. Your choice of hotels will be followed if rooms are available. Otherwise, assignment will be made to best possible advantage elsewhere. You will receive a confirmation directly from the hotel. (NOTE: All rates are subject to change.) If you desire accommodations in a Detroit hotel not listed or a motel, please so indicate. The Housing Bureau will try to place you there.

FAMILY PLAN — The hotels listed offer a "family plan" whereby children under 14 years of age will be accommodated in the same room with their parents at no extra charge. If more than one room is required to accommodate children, the hotel will charge only the single rate for each additional room.

ANNUAL MEETING HOTELS

Hotel	Singles	For Two Persons		Suites	
		Doubles	Twins	1 Bedroom	2 Bedrooms
1 Detroit-Leland	$7.50-13.50	$10.50-16.00	$12.00-19.00	$25.00-35.00	$38.50-50.50
2 Henrose	6.50-10.50	9.00-13.50	12.50-16.00	25.00	45.00
3 Pick-Fort Shelby	6.00-12.75	9.00-15.50	10.50-16.25	23.00-43.50	39.75-58.75
4 Sheraton-Cadillac (Headquarters Hotel)	8.50-18.00	14.35-20.50	14.85-23.00	29.00-37.50	46.00-56.00
5 Statler Hilton	7.00-13.50	12.50-17.00	14.00-24.50	38.00-44.00	59.50-97.00
6 Tuller	5.00- 9.00	9.00-12.00	10.50-15.00		
7 Wolverine	6.00- 9.00	8.50-10.00	11.00-18.50	25.00	35.00-45.00

APPLICATION FOR HOTEL ACCOMMODATIONS

MAIL TO: Housing Bureau, AVMA
Detroit Convention and Tourist Bureau
626 Book Building
Detroit 26, Michigan

CHOICES OF HOTELS: 1st CHOICE: HOTEL _____ 2nd CHOICE: HOTEL _____

3rd CHOICE: HOTEL _____ 4th CHOICE: HOTEL _____

ACCOMMODATIONS DESIRED: RATE DESIRED:

_____ Room(s) with one bed for one person (Single) $ _____ to $ _____

_____ Room(s) with twin beds for two persons (Twin) $ _____ to $ _____

_____ Room(s) with one bed for two persons (Double) $ _____ to $ _____

_____ Suite(s) parlor and one bedroom $ _____ to $ _____

_____ Suite(s) parlor and two bedrooms $ _____ to $ _____

ARRIVAL TIME: Date _____ Hour _____ DEPARTURE TIME: Date _____ Hour _____

LIST NAMES OF ALL PERSONS WHO WILL OCCUPY EACH ROOM:

Name Street Address City and State

_____

_____

_____

_____

_____

_____

CONFIRM RESERVATION TO: NAME _____

NAME OF COMPANY _____

STREET ADDRESS _____

CITY _____ ZONE _____ STATE _____

Recommendations to Reduce Poultry Condemnations

Because poultry condemnations in some areas are running as high as 10%, a fact-finding conference on condemnation was held at Auburn, Ala., recently. Seventy-three representatives from agricultural experiment stations, extension services, state departments of agriculture, state poultry associations, poultry inspection branch of Agricultural Marketing Service, the public health service, and various poultry industries from 12 states attended.

As a result of studies made by 3 workshop groups at the conference, 13 recommendations for reducing condemnation problems were given. Six pertained to improvement in management practices, hatchery sanitation, and proper processing as means of reducing condemnations.

Seven recommendations pertained to procedures and conduct of the poultry inspection branch of the Agricultural Marketing Service. It was recommended that the poultry inspection branch take immediate steps to improve communications and relationships with management at all levels; that a 10-minute rest period each hour be allotted to each inspector; that the inspection service refrain from setting up certain operating procedures where there is no connection with sanitation or wholesomeness; that new regulations be based on research and be thoroughly reviewed and approved by the inspection service and consultants before becoming effective; that reasons for changes be clearly explained to plant management as well as to local inspection personnel; that the inspection service re-evaluate interpretations of certain regulations in the inspectors' handbook in the light of results of recent research; that the present attitude concerning appeal inspection be re-evaluated; and that the technical training of both veterinary and lay inspectors be improved and increased.—*Feedstuffs (Dec. 17, 1960): 3; (Jan. 7, 1961): 56.*

Monkey Research Centers Planned

The United States government plans to construct five $2,000,000 monkeys research centers, each housing approximately 500 monkeys. The first site will be near Portland, Ore.—*All Pets (July, 1960): 89.*

One source for all your equipment!

Sani-Cage services have been developed exclusively for the veterinarian. They include:

- ☐ Free planning and layout by our experienced representatives.
- ☐ A complete line of furniture, cages, fencing and professional equipment.
- ☐ Financing, if desired, through our own program. You deal with Sani-Cage alone.

If you are planning to build, remodel, expand or add needed equipment, it will pay you to get in touch with us. There is a Sani-Cage representative near you to aid with your planning and explain our complete program. No obligation, of course. May we hear from you?

Sani-Cage MANUFACTURING CO.
6815 STONY ISLAND AVE., CHICAGO 49, ILL.

- ☐ Reception Room Furniture
- ☐ Office Furniture
- ☐ Examination Room Equipment
- ☐ X-Ray and Dark Room
- ☐ Surgical Room Equipment
- ☐ Orthopedic Equipment
- ☐ Ward Equipment
- ☐ Stainless Steel Cages
- ☐ Fencing
- ☐ Incinerators
- ☐ Layout and Planning
- ☐ Financing Program

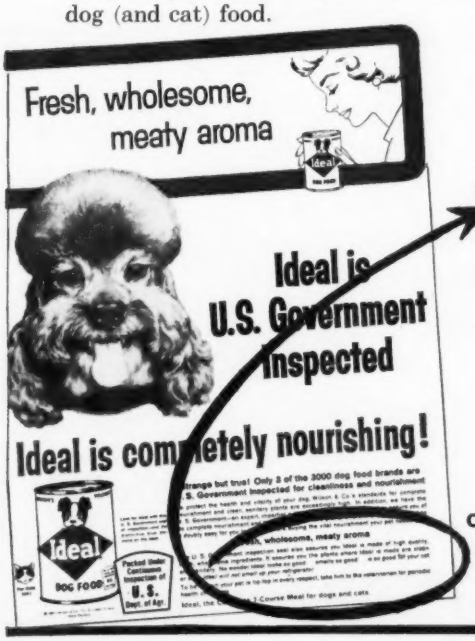
Send for our NEW 32-page catalog of Veterinary equipment. Yours for the asking.

Rx for complete dog nourishment

WILSON QUALITY + Packed Under Continuous Inspection of **U. S.** Dept. of Agr.

Only 3 of the 3000 dog food brands are inspected by the U.S. Government. One of these three—Ideal Dog Food—is manufactured by a meat packer famous for quality products...Wilson & Co.

When you recommend Ideal Dog Food to a pet owner, you are recommending the *only* dog food that carries these two guarantees of complete nourishment in every can...*the assurance of a great name in meat products*...plus continuous inspection by the U.S. Government. This means Ideal is *certified* by the U.S. Department of Agriculture as a normal maintenance dog (and cat) food.



The third important assurance of good health for dogs & cats is *YOU*. This is how Ideal encourages pet owners to rely on *all three:*

"To be certain your pet is tip-top in every respect, take him to the veterinarian for periodic health check-ups"

Feed and recommend Ideal with complete confidence!

WILSON & CO., INC.
Chicago, Illinois—Meat Packers

CLASSIFIED ADVERTISEMENTS

PERSONAL WANT ADS—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

TOTAL WORD COUNT must include complete box number address (7 words) or personal address line.

COMMERCIAL WANT ADS—$5.00 for the first 25 words, 25 cents for each additional word; $1.00 for use of box number. (See paragraph above for total word count.)

Remittance must accompany ad.

DEADLINES

1st of month issue — 8th of month preceding date of issue.

15th of month issue — 22nd of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the box number, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be sent to the advertiser.

Wanted—Veterinarians

Wanted—the Agricultural Division of the American Cyanamid Company is creating a new regional sales area and requires a veterinarian with 2 to 5 years' experience for the position of regional technical service representative. This area, to be known as the West Central Region, will have its headquarters at Minneapolis, Minn. Responsibilities include promotion and service of technical programs. Address: Employment Supervisor, Agricultural Division, American Cyanamid Company, P.O. Box 672, Princeton, N.J.

Wanted—junior student for summer work in Pennsylvania mixed practice. Very little kennel work. $350 per month. Address Box D 65, JOURNAL of the AVMA.

Position available for veterinarian after July 1 in southern California AAHA hospital. Small animal practice. Salary open. State qualifications. Address Box D 64, JOURNAL of the AVMA.

CALIFORNIA STATE VETERINARY POSITIONS

Excellent opportunities in California state government in either disease control and pathology or meat hygiene for graduate veterinarians with or without experience in practice. Senior veterinary students eligible to apply before graduation. Salary range—$584 to $710. Liberal employee benefits. Write at once for further information. CALIFORNIA STATE PERSONNEL BOARD, 801 Capitol Avenue, Sacramento 14, Calif.

Wanted—assistant in predominantly large animal practice in central New York State. Possibility of future partnership. Immediate opening. Address Box D 11, JOURNAL of the AVMA.

Wanted—veterinary student who will not return to veterinary school for 1 year. Opportunity to save money and gain experience in mixed practice. Address Box D 61, JOURNAL of the AVMA.

Wanted—assistant veterinarian for AAHA hospital in Chicago area. Recent or new graduate. Address Box D 58, JOURNAL of the AVMA.

Wanted—veterinarian with Virginia license for part time work in small animal hospital in northern Virginia area close to Washington, D.C. Address Box D 5, JOURNAL of the AVMA.

Wanted—associate veterinarian for small animal practice on Long Island only 30 miles from New York City. Address Box D 57, JOURNAL of the AVMA.

Wanted—licensed veterinarian for staff of completely-equipped, modern, AAHA small animal hospital in New York City suburb. Complete details in first letter. Address Box D 56, JOURNAL of the AVMA.

Wanted—young assistant veterinarian for rapidly-expanding small animal practice in St. Louis suburbs. Salary commensurate with ability. Excellent opportunity. Address Box D 52, JOURNAL of the AVMA.

Wanted—Positions

Experienced graduate (MO '60) desires position as relief veterinarian in small animal practice during August, September and October in St. Louis or Kansas City areas. Address Dr. Charles Leezy, University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia, Pa.

Experienced graduate (OSU '59), married, age 27, desires position in mixed practice leading to partnership. Prefer dairy and small animal. Desire Ohio, Indiana, southern Michigan. Address Box D 67, JOURNAL of the AVMA.

Colorado graduate, married, 17 years' experience in general practice, desires position in commercial, institutional or private field, affording advancement both professionally and economically. California preferred but will consider Rocky Mountain area or west. Address Box D 66, JOURNAL of the AVMA.

Veterinarian with general practice and poultry experience desires position with advancement potential. Eastern states preferred. Address Box D 53, JOURNAL of the AVMA.

Graduate (KSU '58), married, completing military obligation in July, desires position or to lease small animal practice in Southwest, Midwest, or California. Address Box D 60, JOURNAL of the AVMA.

Ambitious young veterinarian with 3 years' experience desires position in small animal practice. Licensed in Illinois, Missouri, Colorado and Texas. Address Box D 10, JOURNAL of the AVMA.

Veterinarian with 7 years' experience in general practice desires work in veterinary biological or diagnostic laboratory or will accept position in group practice in Minnesota or Iowa. Address Box D 55, JOURNAL of the AVMA.

Graduate (MSU '59), married, desires position with future in small animal hospital in Midwest. Licensed in Michigan, Illinois. Available in August. Military commitment completed. Address Box D 50, JOURNAL of the AVMA.

For Sale or Lease—Practices

For sale—mixed practice in large Texas city. Price of $7,500 includes all equipment and drugs. Good lease available. Address Box D 17, JOURNAL of the AVMA.

For sale—established small animal practice. Light horse work available. Heart of Bergen County, N.J. Unique opportunity. Address Box D 16, JOURNAL of the AVMA.

For sale or lease—fully-equipped, prosperous small animal hospital with an apartment in good location in Washington, D.C. Address Box D 63, JOURNAL of the AVMA.

For sale—large animal practice in extensive cattle and hog feeding area in southeastern South Dakota. Annual net—$15,000 to $18,000 last 5 years. Graduate veterinarian in area for 40 years. Five bedroom house, office, inventory and some equipment, $25,000. Must have capital. Address Box D 4, JOURNAL of the AVMA.

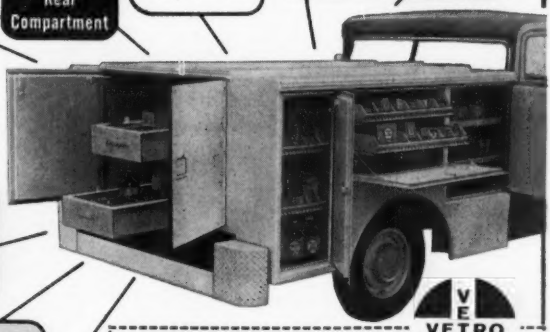
For sale—California AAHA veterinary hospital, established 26 years. Completely remodeled and air conditioned. Gross—$65,000. Can be increased. Fast-growing beach town 20 miles from Los Angeles smog-free area. Perfect climate year around. $30,000 will handle. Newly-remodeled companion hospital 2 miles away; 2,800 square feet. Corner lot, 80 by 120 feet, on busy street; 38 kennels. Practice potential good. Drugs, x-ray, fully-equipped. Full price—$35,000. $10,000 will handle. Address Box D 62, JOURNAL of the AVMA.

For sale—Indiana mixed practice in thriving community. Includes fully-equipped hospital. Priced at real estate value. Address Box B 13, JOURNAL of the AVMA.

Only VETRO® Gives You ALL These Professional Features!

Good Looking, Ruggedly Built to Reduce Your Field Transportation Costs!

Fully Enclosed Rear Compartment
Balanced Heat in All Compartments
Sink with Hot Running Water
Built-In Refrigerator
Slide-Out Trays
Pull-Out Drawers
Dustproof Compartments, Individually Lighted
Lower Initial Cost
Lower Maintenance Cost



Write for brochure and name of nearby distributor

VETRO

READING BODY WORKS, INC.
420 Gregg Avenue, Reading, Pa.
Please send full details on new Advanced Design VETRO Body, without obligation.

NAME_____

ADDRESS_____

CITY_____STATE_____

(J-461)

PREGNANCY DETERMINATION

In mares 45th to 150th day $7.50 Use dry sterile equipment to collect 20-cc blood sample and forward to:

COLORADO LABORATORIES INC.
4950 York St. Denver 16, Colo. MAin 3-5373

Results reported to profession only within 96 hours. Other professional diagnostic laboratory services available. Write for free information.

For sale—mixed practice in Sacramento Valley. Small animal hospital and large animal facilities located on one acre of major highway. Excellent potential. Five year average gross—$33,000. Priced for quick sale. Practice and real estate—$26,000; $4,000 down. Balance financed. Address Box D 14, JOURNAL of the AVMA.

For sale—Indiana established, fully-equipped general practice in Michiana area. Clinic includes apartment, drugs, 2-way radio and chute. Credit and personal references in first letter. Address Box D70, JOURNAL of the AVMA.

For sale—Louisiana hospital and boarding kennel combined. 25 minutes from the "Heart of New Orleans." Includes upstairs apartment. No competition. Price—$20,000 or lease $250 monthly with buying option. Address Box D 59, JOURNAL of the AVMA.

For sale—small animal hospital in Kansas with or without property. Established 8 years. $5,000 will handle down payment. Address Box D 54, JOURNAL of the AVMA.

Miscellaneous

For sale—1961 Gordon Veterinary Body on 1961 Chevrolet truck. 8,000 miles. Excellent condition. Leaving state due to health. Address Dr. L. E. Orsborn, 1413 Fairway, Indianola, Iowa.

Offering $15 for spinal cord of cow dead of milk fever or complications fairly soon after onset. Send case history before arranging dissection. Address Dr. Max Unger, 1465 Broadway, New York 36, N. Y.

Wanted—pups with cleft palate or parent dogs of such pups, for study of cause and treatment of human cleft palate. Address Dr. R. Dean or Dr. John Kelleher, c/o Mercy Hospital, 2221 Madison Ave., Toledo 2, Ohio, or call collect CH 8-6428, Toledo, Ohio.

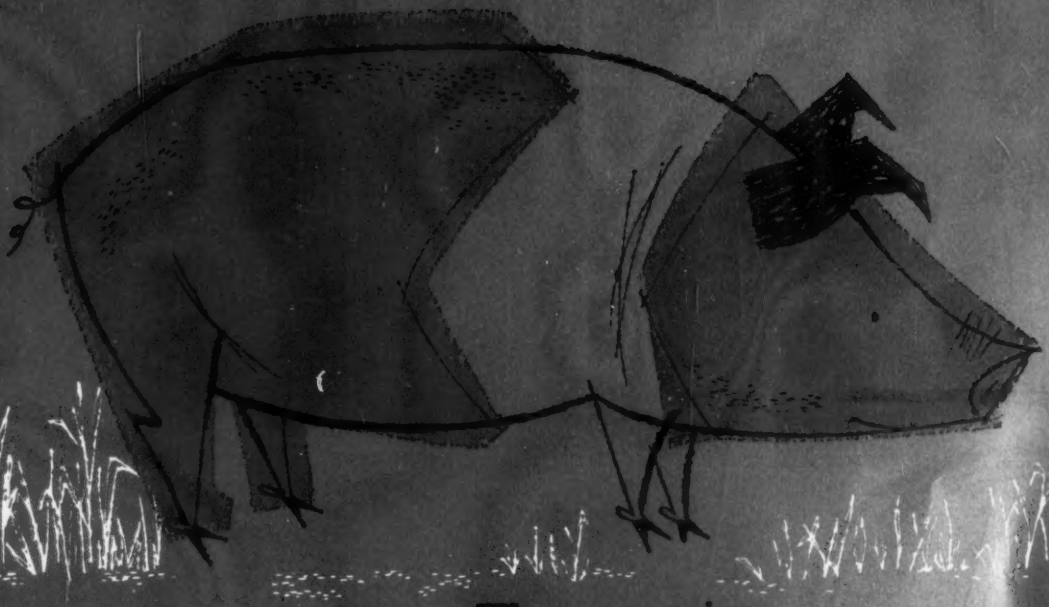
Best opportunity for Chicago veterinarian. Two-story house with parking lot for 6 cars half a block from Lake Shore Drive. Owner moving to country. Will sell with down payment. 18 rooms, full basement and attic. Address Box D 51, JOURNAL of the AVMA.

Index to Advertisers

Abbott Laboratories
Erythrocin Injectable 20, 21
Affiliated Laboratories, Inc.
Hog cholera vaccine 13
American Sterilizer Co.
Autoclave 37
Armour Pharmaceutical Co.
FSH-P, P.L.H., P.O.P. 19
Baldwin Laboratories, Inc.
Hog cholera vaccine 26
Colorado Laboratories, Inc.
Diagnostic services 60
Corn States Laboratories
Duragen ..... 2nd cover
De Laval Separator Co.
Milking machines 15
East River Wire Works
Animal cages 4
Eaton Laboratories
Furacin 30
Furacin Water Mix 33
Fort Dodge Laboratories
M.L.V. 5
Biotized Bacterins 28
Gaines—General Foods Corp.
Gravy Train 23
Greyhound Corporation
Package express service 35
Hyland Laboratories, Inc.
Pre-med 7
Jensen-Salsbery Laboratories, Inc.
Cytogen ..... 4th cover
Ken-L-Biskit—Quaker Oats Co.
Dog food 38
Kirschner Manufacturing Co.
Veterinary equipment 45
Massengill, S. E. and Co.
Pet-tabs 18
Merck and Co.
Diuril 16, 17
Sulfabrom 39
National Cylinder Gas Co. 40
National Laboratories, Inc.
GW'r-vita 22
Norden Laboratories, Inc.
Eva 1
Parke-Davis and Co.
Abdec drops 29
Parlam Corporation
Sebumsol 24
Pfizer Laboratories
Mastalone 8, 9
Liquamycin Injectable 52, 53
Pitman-Moore Company
Tissuvax DH 3
Suivax ..... 3rd cover
Reading Body Works
Vetro body 59
Research Laboratories, Inc.
Ery-Jex 41
Sani-Cage Manufacturing Co.
Veterinary equipment 56
Schering Corporation
Fulvidex 11
Standard Brands
Hunt Club Burgerbits 27
Swift and Company
Pard 36
Vitamineral Products Co.
Ribad II, Con-o-mineral 10
Warren-Teed Products Co.
Thera-tergent 43
Wilson and Co., Inc.
Ideal dog food 57
Wyeth Laboratories
Sparine 25

SAFETY FIRST...

with lasting protection



Swivax*

The superior hog-cholera vaccine for SOLID immunity...

MODIFIED LIVE VIRUS • RABBIT ORIGIN • VACUUM DRIED

*REGISTERED TRADE MARK

(Licensed under U.S. Patent 2516978)

PITMAN-MOORE COMPANY

division of

ALLIED LABORATORIES, INC.

In Your Distemper Immunization Program

"Be Cytogen® Sure"

Cytogen: Canine Distemper Vaccine, Modified Live Virus, Canine Tissue Culture Origin, Lyophilized . . . the first modified live virus vaccine produced on dog kidney cells.

1 Be sure of high antigenicity:

To the recognized superiority of a modified live virus vaccine, **Cytogen** adds increased effectiveness where it counts most . . . the strength, quality and antigenicity of the virus itself. As little as ten egg infectious doses of **Cytogen** virus protected susceptible pups from direct challenge[1]. By comparison, 64 to 250 E.I.D.$_{50}$ of chick embryo origin virus are required to confer immunity[2].

2 Be sure of rapid response:

When distemper virus is grown in the Jen-Sal canine kidney cell system and becomes **Cytogen** virus, its ability to invade the dog is also enhanced. Susceptible test animals successfully withstood challenge with virulent virus as early as four days after vaccination with **Cytogen**[3].

3 Be sure of maximum stability:

Cytogen contains an exclusive stabilizing agent. With this stabilizer **Cytogen** virus has successfully protected dogs from virulent virus challenge after being artificially aged for a period equivalent to fourteen months of storage at room temperature[4]. For even greater superiority **Cytogen** is held well below freezing from the time it is produced until you receive it.

Cytogen is now available for immediate shipment from your Jen-Sal branch. Order now and "Be **Cytogen** Sure."

Package: 10 — 1 dose vials, with diluent

Clinical and Research References:

1. Sinha, S. K., et al, Studies on Canine Distemper Immunization with a Tissue Culture Vaccine. Vet. Med., Vol. 55, No. 4, April 1960.
2. Burgher, J. A., et al, The Immune Response of Dogs to Distemper. Cornell Vet., Vol. 48, No. 2, 1958.
3. Paton, I. M., et al, Progress in Distemper Immunization. Jen-Sal Small Animal Topics, August 1960.
4. Dept. of Biological Research, Jensen-Salsbery Laboratories. Unpublished Research Data.

another new and exclusive product of Jen-Sal® *research!*

JENSEN-SALSBERY LABORATORIES, INC.
General Offices: Kansas City 41, Missour